Employment and Immigration Canada
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Ministry of Advanced Education and Job Training, and Ministry Responsible for Science and Technology

JOB FUTURES

BRITISH COLUMBIA

An Occupational Outlook to 1995

1989 edition

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Minister of Employment and Immigration

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Message from the Minister of Employment and Immigration

I am pleased to be able to present, jointly, with the B.C. Ministry of Advanced Education and Job Training, and Ministry Responsible for Science and Technology this premiere edition of JOB FUTURES - BRITISH COLUMBIA. Based on the Canada JOB FUTURES, produced by my department, it provides specific and detailed information on B.C. jobs and job prospects.

JOB FUTURES - BRITISH COLUMBIA provides information on the career choices that are available in the B.C. labour market today and where these jobs are likely to be in 1995. The publication is designed to help British Columbians find satisfying careers for themselves that both challenge and fit their aspirations.

The labour market data behind this publication includes Employment and Immigration Canada's Canadian Occupational Projection System (COPS). This system provides educators and counsellors with occupational information that they can use in decision making and in advising those making career decisions.

Many individuals, associations, companies and agencies have contributed valuable information to make this publication possible and many of these are listed as sources of further information. To all of these, I express my thanks.

It is my hope that this publication will lead to a more efficient and effective functioning of the British Columbia labour market and assist British Columbians to find satisfying and productive careers.

Barbara McDougall
Minister of Employment and Immigration

Province of British Columbia

Ministry of Advanced Education and Job Training, and Ministry Responsible for Science and Technology

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Message from the Minister of Advanced Education and Job Training, and Minister Responsible for Science and Technology

With the 1990s fast approaching, it is more important than ever to make well planned career choices. Employees face a diversified and demanding job market where they must balance the challenges of technology, working conditions, and lifestyles.

To help you choose your career path, I am pleased to present JOB FUTURES - BRITISH COLUMBIA, 1989 edition. Employment and Immigration Canada and The Ministry of Advanced Education and Job Training, and Ministry Responsible for Science and Technology have joined together to provide a wealth of information for British Columbians who want to learn train, or retrain for a productive, satisfying career.

This publication provides a link between the provincial labour market and the educational and training needs of individuals. To all of you facing this challenge; use all the information you can get, consider your options, and good luck in your career.

Stanley B. Hagen
Minister of Advanced Education and Job Training, and
Minister Responsible for Science and Technology

ACKNOWLEDGEMENTS

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We are also very grateful for the information provided by associations, unions, industries, and agencies in the form of special studies, data or comments on early drafts.

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TABLE OF CONTENTS

Introduction i

Occupational Outlooks

11	Managerial, Administrative and Related Occupations	1
21	Occupations in Natural Sciences, Engineering and Mathematics	13
23	Occupations in Social Sciences and Related Fields	39
27	Teaching and Related Occupations	47
31	Occupations in Medicine and Health	55
33	Artistic, Literary, Recreational and Related Occupations	73
41	Clerical and Related Occupations	81
51	Sales Occupations	99
61	Service Occupations	109
71	Farming, Horticultural and Animal Husbandry Occupations	121
73	Fishing, Trapping and Related Occupations	125
75	Forestry and Logging Occupations	127
77	Mining and Quarrying (including Oil and Gas Field) Occupations	133
82/83	Processing Occupations	139
85	Product Fabricating, Assembling and Repairing Occupations	155
87	Construction Trades Occupations	171
91	Transport Equipment Operating Occupations	187
93	Material Handling and Related Occupations	195
95	Other Crafts and Equipment Operating Occupations	197

Appendices

Appendix 1	Institutional General	203
Appendix 2	Apprenticeship	205
Appendix 3	Directory of Colleges, Institutes and Universities in British Columbia	206
Appendix 4	B.C. Courses Matrix	209
Appendix 5	Technical Comments	224

Indices

Index Of Occupations By Classification Number	227
Index of Occupations by Title	236

INTRODUCTION

Tomorrow's Jobs and How to Prepare for Them

One of the great transitions we each make in life is the one from school to work. It is a transition that deserves some thought, planning and preparation, and perhaps a good deal of time, effort and patience too. After all, most of us will be working for thirty to forty years.

So what is really at stake?

Any career choice activity is a major step. Making the wrong move can be costly. Career and job choice often sets the pattern for one's whole lifestyle. After all it is work that provides one's income. Work can provide a lot of satisfaction or a lot of frustration depending how well it fits one's interests. Education and training take effort and money. The choice of a career may entail moves away from family and friends.

With so much at stake it is important to look carefully at oneself and at the job environment around you.

The first step is look at yourself

What you bring to your exploration of careers is knowledge about yourself. You should consider:

- Your interests. What would you like to do? What type of activities do you like? Try and think in terms of work and in terms of many years of these activities.
- Your aptitudes. What do you do well? Are you good at maths? How about your language skills, or your capacity to understand complex matters? Are you analytical, creative, well coordinated? Again think of these abilities in terms of possible work areas.
- Other aspects such as your lifestyle, values, temperament, your physical capacity (although this is becoming less important as a guide to possible jobs), your feelings about working outside or in small or large communities, your wishes on whether you want to work with lots of people or mainly alone.
- The educational route that you are intending to take, and your willingness to study and learn.

Feeling out the job environment

A look at the job environment partially mirrors the look you have taken at yourself. It then moves outside of yourself to consider the demands of the economy. Occupation or job characteristics are varied but essentially include a few main aspects:

- The nature of the job. What actually goes on inside that job? What sort of work is carried out? Are there particular interest or ability characteristics related to that occupation? Is the work environment inside or outside, city or rural?
- Education. It is important to know how to prepare for the occupation through education, skill acquisition and meeting training requirements of the occupation and employers.
- Job prospects gives us the crucial information about the economy, how jobs are created and how likely it is that we will find the sort of work that we are thinking of doing.

Other important job environment information includes whether work is normally full-time, part-time or seasonal; whether the job field offers advancement opportunities; the opportunities for women and other special groups to enter the job field; the needs for continuing education to meet changing job skills and the potential income that can be generated from your employment choice.

Deciding on a Career Field

Some of you are so talented in an area that your field of work will seem obvious to you. Some of you have strong interests that have built from childhood and may lead into careers; perhaps some of you have role models in parents, friends or teachers. Many of you probably have absolutely no idea what work you want to do when you leave school. In this economy it is also not unusual for individuals to move from one job field to another because of job loss or to establish a new career.

Anyone who is exploring career choice needs a lot of information. It does not matter which group you fall into. If you do have a strong commitment to enter a very specific job field it is still important to research the training requirements or where the job is likely to be located. It is also important to try and open up your options, at least a little, in case the economy does not cooperate with your ideas of the best work for you. If you do not have any idea of what work you want to do after leaving school it certainly is not time to panic, but it is time to start preparing by looking at the economy, at the jobs the economy offers and by choosing a variety of fields that you feel might suit you best.

What This Publication Provides

JOB FUTURES - BRITISH COLUMBIA responds to this need for information for career exploration. The occupational profiles in this publication briefly describe the nature of the work, the education and skill requirements, job prospects and incomes that are generally associated with a wide variety of occupations.

The job prospects section highlights several aspects that are considered the most important when looking at an occupational field as a source of a job or career. The size of an occupation is important as, generally, a larger occupation will offer more job openings than a smaller one. Growth prospects for each occupation are also important especially when compared to the overall growth expected for the economy. Replacement needs are also important as a source of job opportunities so the overall pattern of openings, that are projected in each occupation from 1987 to 1995, includes both opportunities from growth and from attrition.

Some of the other aspects which are important in the job environment are also highlighted. These include the impact of technological change; information on which industries are the predominant employers; work patterns such as full-time or part-time and the geographic distribution of employment across British Columbia. Employment opportunities for women are also discussed.

The 187 occupational groups which are included in JOB FUTURES - BRITISH COLUMBIA include the larger job fields, or those with strong growth, good long term prospects, special importance to the B.C. economy, or are career fields where planning and information is most necessary. These 187 occupational groups are expected to employ about one million workers by 1995 in British Columbia and will comprise three out of four jobs in the economy. Although the occupations selected cover the full spectrum of work, extra attention is given to those jobs that require post-secondary education and training as well as those projected to grow rapidly.

Exploring the Economy

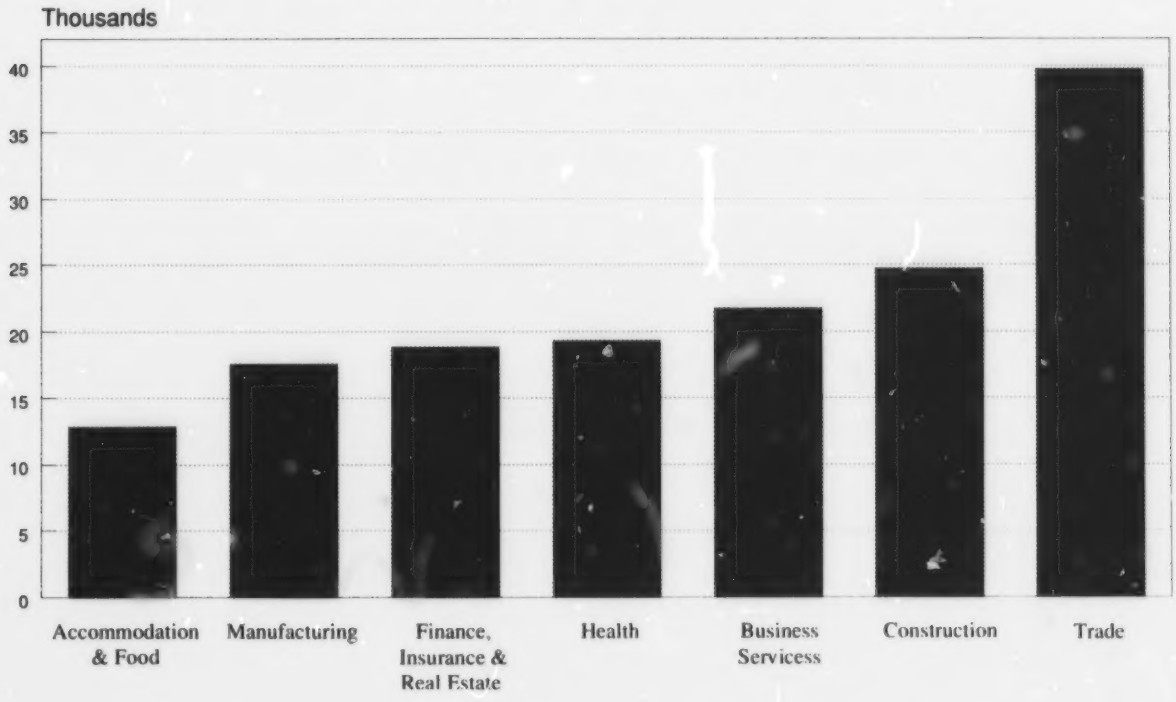
The British Columbia economy is in the process of long term change. Employment was severely cut in the early 1980s due to an economic recession and only recovered to pre-recession levels by 1987. At the same time the B.C. economy is showing signs of structural change, as trade patterns and products change and because of technological changes which encourage growth in certain industries.

Yet there are some major and traditional industries in B.C. which, by incorporating new technology, are sustaining their importance in the economy.

Industrial trends, such as these, provide part of the explanation of occupational growth. The service industries will provide many of the new jobs. These service industries, covering tourism, retail sales, health care, financial activity and business services include a wide range of occupations from management and professional fields to basic food service and janitorial work.

The traditional, resource and wood processing industries, which are expected to sustain their operations will contribute fewer of the new jobs but will require replacement workers.

Main Industries of Employment Growth 1987 - 1995



Note: These industries account for 81% of employment growth to 1995.

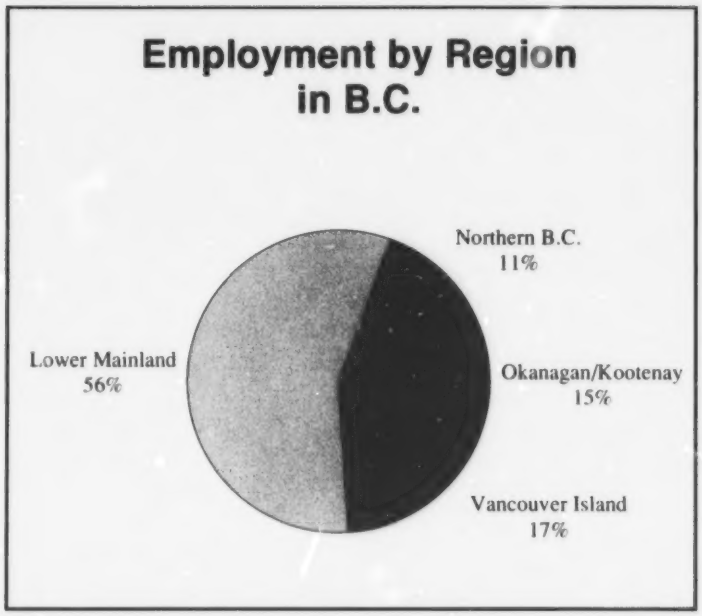
Our best-guess scenario of the B.C. economy to 1995 is a fairly optimistic one indicating at least moderate employment growth during the next eight years, and the creation of 192,000 new jobs. These projections indicate job growth averaging over 1.7% annually from 1987-1995, less than half the level of the robust rates achieved in the late 1970s, but a big improvement over the outright "job loss" environment of the early 1980s.

An aging work force means that attrition, or job openings to replace workers who retire, die or leave the labour market, are also likely to be substantial; this should provide another 228,000 job openings in the years ahead.

Location Makes a Difference

Some occupations are most likely to be found in certain geographic areas. This is often tied to where industries operate best or where there are enough people to support a particular type of work.

Over half of total employment in British Columbia is found in the Lower Mainland but there is quite a lot of variation in the geographic distribution of employment of specific occupations. For example, in 1986, 74% of the occupational group 2343, lawyers, found employment in the Lower Mainland. On the other hand, the occupational group 7511, forestry conservation occupations, only had 9% of its employment in the Lower Mainland.



Small Business Generates Jobs

Along with the industrial trends in the economy, the organization of firms is also changing. The future work environment will be very different from that which existed in the past. Then most people worked in large organizations. In recent years, most new jobs have been created by small firms and by self-employment. Already almost 20% of the workforce, or one out of every five, are self-employed. Self-employment is growing faster than salaried employment. Many new companies and jobs will be in the service sector and it is this sector that tends to provide many opportunities for small business operation. The fastest growing industry, within this sector, is expected to be services to businesses, including firms providing accounting, engineering, computer, advertising, word processing, human resources and management consulting services.

The Impact of Technology

No exploration of the labour market would be complete without considering the impact of technology.

Almost all of us have heard of some of the more dramatic changes taking place in the economy because of technological developments. It is new technology that is reducing employment levels in manufacturing at the same time as production increases. But this new technology is also allowing these same industries to compete better on world markets thus ensuring continued jobs. The pulp and paper industry remains strong in British Columbia and, because of continuous upgrading of technology, leads world producers.

"We must openly embrace the new technologies. There is no alternative: failure to do so "...will mean... "the loss of prosperity and jobs".

Economic Council of Canada

New technology is also opening up whole new industries or allowing better use of resources. Aquaculture, using new technology, is allowing B.C. to produce more fish just when there are fewer fish to harvest from the oceans, and silviculture developments will help support our woods related industries. The merging of computers, communications and software has opened up new industries in B.C. Most of us also realize that there will be a lot of change in the way work is done and in the skills people need to do their work.

Many changes are easy to see. They've affected the work of secretaries, miners, farmers, mechanics, health care professionals. The list of occupations affected by technological change is really a list of all the occupations in the economy. Changes today, and those expected in the future, are as dramatic as those of the industrial revolution. And the pace of change is accelerating.

Tomorrow's Jobs

Industry, organization and technology combine to provide certain types of work. Occupations fade away. New occupations appear. Yet the most visible changes are those that take place within the occupation itself.

Large job fields will continue to produce most of the job openings from 1987 to 1995. The long term shift to service industries has been occurring over the past 20 years and these industries have a lot of employment in a relatively few specific job areas. The result of this is that the largest occupations in management, sales, clerical, food preparation and health care will offer many more opportunities than some small but fast growing occupations in fields such as aquaculture or film production. For example, sales workers, an occupation group including sales clerks and other sales persons, will number about 97,000 in 1995 and this will account for over six percent of all employment.

Focus on Skills

While we look at occupations and job opportunities we must also look at just what is happening to the skills required within these occupations.

Service industries are changing within themselves as much as expanding within the economy. Tourism is becoming sophisticated. Retail trade is developing mostly through small business growth selling a wide array of specialty products to very knowledgeable customers. Business services is one of the fastest growing service industries and health care is incorporating new technology at a high rate. While the largest occupations in these industries continue to provide most of the job openings, the skills that workers use are changing.

The widespread effect of technology on skills is not yet entirely clear but there is no doubt that many skill changes are under way. The most pervasive is that related to computer use. In many cases skill levels of occupations increase; in some occupations skill levels may decrease. Clerical workers are freed from repetitive tasks but then are called upon to deal with more administrative matters or to have specialized topic knowledge. In time, they may be expected to handle an array of functions often requiring the use of computer systems for word processing, publishing newsletters or maintaining accounts. This increases skill requirements on two fronts; in business knowledge as well as in computer use. On the other hand, a cashier using an automated scanner needs less product knowledge and does not need computer knowledge.

What seems clear is that the requirements for improved levels of the "basic skills" found in reading, writing and math, and for analytical and technical skills, will continue to increase. Interpersonal and communication skills required to deal with people, in all job settings ranging from the factory floor to the executive suite, are becoming more important.

Included among the hottest and most transferable skills are those related to communications, math, computer literacy and business knowledge or entrepreneurial skills. In today's labour market, and tomorrow's, these skills will be critical for career success.

Because of the emphasis on these skills, education is more important than ever.

While some job fields identify a minimum educational level for people to enter the field, the reality of the labour market is that employers often prefer to hire those who have completed more education or training. This is partially because there is a lot of competition for jobs. It is also because the work world is in a process of change. People who have more knowledge are more adaptable to this change. For example several repair trades note that a minimum entry level is Grade 10 but employers prefer to hire workers who have completed Grade 12. Much of this employer preference arises because repair functions now extend to sophisticated products using electronics components and, therefore, mechanics require more knowledge and skills.

Make an Informed Choice for your Future

JOB FUTURES - BRITISH COLUMBIA is provided to help you make an informed choice about your future job area and your career path. One hundred and eight-seven occupational groups, encompassing even more occupational specialties and covering three-quarters of B.C.'s job market, are described in this publication.

Your search for information should not stop here. You should find out all you can about jobs. Other sources of career information are plentiful, including various publications available from the local Canada Employment Centers; colleges and training institutions; employment training counsellors in job training area offices, or Training and Enterprise Centres of the B.C. Ministry of Advanced Education & Job Training; school counsellors; the federal government Public Service Commission; industry and professional associations; vocational counsellors and aptitude testing consultants. Some of the key information sources are listed in a directory in the Appendix.

Remember it is your future and you have a lot at stake.

11

Managerial, Administrative and Related Occupations

▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼

General Managers and Other Senior Officials 1130

Nature of the Work

Senior management positions include presidents, vice-presidents, chairpersons, directors, executive directors and general managers. Besides planning, organizing, motivating and directing others, they make decisions regarding overall corporate strategy, policy, structure, and finance. They spend much of their time in meetings, obtaining and synthesizing information in order to make effective decisions. These are positions of leadership.

Senior management are generally older, usually over 45 years, are more experienced, and are more educated than other workers. Most people in these occupations are men, although increasingly women have been attaining these positions and now constitute 15% of these managers.

Education and Skills

These positions usually require university graduation in the arts, sciences, engineering or education, depending on the industry setting. Although an undergraduate degree has become the norm, in many instances a graduate degree is highly desirable; hence 17 years or more of schooling may be required. Fields studied by senior managers vary, and include business administration, economics, engineering, chemistry and psychology.

Though their educational backgrounds may differ, nearly all senior managers have first acquired extensive experience in management and in their particular company before being promoted. Typically, senior managers work their way up the ladder, gaining first hand knowledge of the firm's operations, getting special training and experience over a period of five to ten years or more.

Executives and general managers must be able to rapidly assess large amounts of information prepared by their support staff, and also have excellent communication and negotiating skills to organize and direct the company.

B.C. Job Prospects

This is a very large occupation and one which grew extremely rapidly from 1981 to 1987. Average growth is projected to 1995, based on broad economic growth for the province over this time. This will add 1,950 new jobs in B.C., bringing the total number in this occupation to almost 15,000. Opportunities created by attrition, about 3,280, exceed the new job creation and are above the all-occupation average. This reflects the older age profile of this group. In total, 5,230 jobs due to growth and attrition are expected to 1995.

Senior executives work in a broad cross-section of industries with some concentration in wholesale and retail trade (24%), manufacturing (18%), business and personal services (11%), and finance, insurance and real estate sectors (10%).

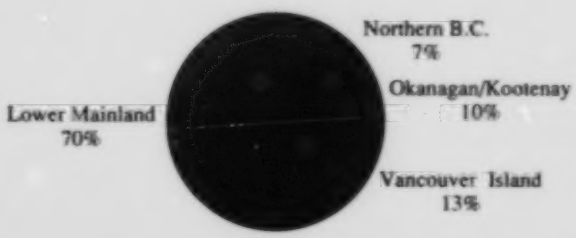
Current labour market conditions are good and better than for most occupations. Unemployment is low among experienced executives with a sound managerial background as well as an in-depth understanding of a particular industry. In spite of this, competition for executive posts is expected to intensify as the labour force ages and the number of qualified and experienced workers applying for these positions increases.

The advent of computerized information processing allows for a reduction in the layers of management in an organization. This will reduce the number of intermediate managers and will require senior managers to better understand computerized information systems in their organization.

Earnings

According to the 1986 Census the average employment income in B.C. for those in this occupation was $54,500 and $58,400 if full-time over the entire year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	7,530	12,860	14,820

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Retail & Wholesale Trade	24%
Manufacturing	18%
Business & Personal Services	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,950	3,280	5,230

1133 Administrators In Teaching and Related Fields

Nature of the Work

School administrators are responsible for staffing, scheduling classes, coordinating school activities, and representing their schools to outside community groups. Superintendents, principals and assistant principals are included in this educational bureaucracy. They are responsible for implementing local school board and B.C. Ministry of Education policy. These positions also include the jobs of university and college presidents, registrars and department heads as well as various business college administrators.

Principals are the most numerous of all school administrators. They provide the leadership and managerial skills required for a school's smooth operation. It takes political and diplomatic as well as administrative skills to handle the issues that confront school leaders today. Principals visit classrooms, review instructional objectives, evaluate teachers, set discipline and classroom procedures, and examine learning materials. Though they prepare budgets, reports and do other paperwork, they spend much of the day conferring with teachers, support staff and pupils, making decisions, advising, explaining or answering questions. Sometimes they meet with parents and other members of the community.

Although most administrators are men, the number of women has been increasing and reached nearly 30% in 1986. Because of the education and experience required to qualify for these positions, the age profile is older than most occupations. Individuals usually do not enter these positions until the ages of 35 to 39 years and average 10 to 20 years in this group.

Education and Skills

Administration in education is not an entry-level position. Most have a teaching certificate, a bachelor's degree and several years of teaching experience. Many have a master's degree in education. People generally move into these positions from teaching, an indication that many reach these positions in the latter part of their careers. For further information on entry-level education requirements, refer to elementary and kindergarten teachers (SOC 2731) and secondary school teachers (SOC 2733).

In addition to experience and education, administrators need leadership and management skills to direct, motivate and inspire teachers, staff and students. Because they are frequently under fire from many groups, self-confidence and the ability to withstand criticism are essential, as are tact and superior communication skills.

B.C. Job Prospects

This is a moderately large occupation, employing over 3,500 persons in 1987 in B.C. However, growth is likely to be below average to 1995 as a result of changing demographics, declining student enrollments and educational policy. By 1995, about 1,100 total job openings are expected, most due to replacements for retiring workers, which should open over 700 jobs. This reflects the older age structure of this occupational group.

About 90% of these jobs are actually in schools and school boards, with about 3% in government. While jobs in education are insulated from fluctuating business conditions, they are susceptible to demographic shifts. Employment is also affected by student/teacher ratios and federal/provincial policies and expenditures on education. Many of these factors are negative influences at present and will likely continue this way through to 1995.

Unemployment is extremely low for this group. However, competition for administrative positions remains intense among aspiring secondary and elementary school teachers.

Earnings

Salaries vary according to the position, level of responsibility, the size of institution and its geographic location. The 1986 Census shows average employment income of $41,500 for all those in B.C. in these occupations, and $45,600 for those working full-time over the whole year.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,420	3,550	3,930

Annual Growth 1987-1995: 1.3%

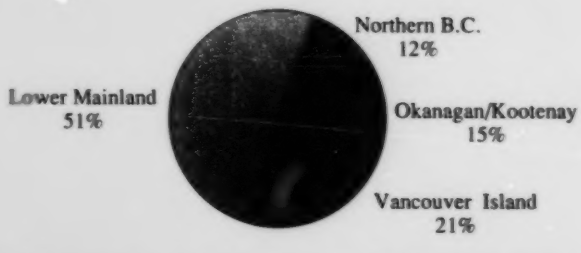
Main Industries of Employment 1986 Census

Education	90%
Government	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
380	720	1,100

Employment by Region



Nature of the Work

These professionals are responsible for setting policies and managing the health care system in hospitals, clinics, extended care facilities, public health agencies, associations, health planning agencies and government departments. Included are hospital administrators, chief dietitians, and directors of occupational health, public health, therapeutic services, volunteer services and admitting departments. Like managers in other organizations, health services managers administer facilities, services, programs, staff, budgets, and relations with other organizations.

Hospital administration can be further broken down into chief executive officers, directors of nursing, medical officers of health, non-medical administrators and directors of public health nursing.

In 1986, over 60% of health and medicine administration jobs were held by women, a substantial increase from 1981. Most jobs continue to be full-time, year-round, but part-time work is increasing.

Education and Skills

Entry to these senior positions usually requires a university degree, preferably a master's, and at least ten years of previous management and supervisory experience. Unlike the past, it is now expected that to move into administration from nursing, medicine or accounting, requires formal training in administration. Courses in hospital management are offered to experienced candidates by the Canadian Hospital Association. Professional certification from the Canadian College of Health Service Executives is also recommended.

There are also non-credit, professional upgrading courses offered by community colleges, BCIT and UBC for nurses and others to develop management skills. Malaspina College offers a two year correspondence program in Continuing Health Care Administration. BCIT offers part-time certificate programs in Health Care Management and Long Term Care Management, as well as a two year diploma program in Health Record Administration.

Personal qualities important in this career are leadership ability, a desire to serve others, an ability to relate to other health professionals and a capacity to work well under pressure.

B.C. Job Prospects

This is fairly a large occupation, employing almost 2,000 persons in 1987, and average growth is projected through to 1995. The combination of new facilities growth and retirements are expected to require 770 new workers and raise total employment to 2,270 over this period. These projections may be somewhat conservative as increasing health care costs also increase the need for better management.

Employment is concentrated in hospitals and other health services (85%), with government accounting for a minor share of jobs (8%). These occupations are generally not affected by an economic downturn but are sensitive to government expenditure policies.

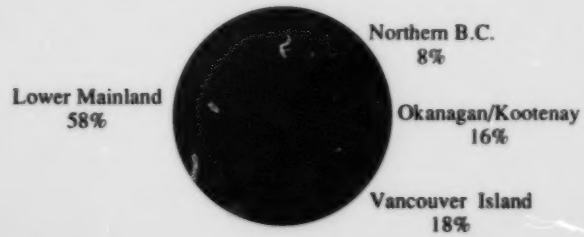
As health care costs increase, administrators will be required to monitor and control expenditures and consult on hospital facilities. If the trend of hiring health care entrepreneurs or contract managers for hospitals increases, opportunities with contracting firms may increase. Centralized financial and other computer information systems will make these managers more efficient.

The shift towards chronic care facilities such as nursing homes, as well as the provision of new services such as day-surgery, home-care and day-care, may increase the demand for personnel to administer these programs. Current employment conditions are good with very low unemployment.

Earnings

According to the 1986 Census, the average employment income in this field in B.C. was $34,300, while those working full-time over the whole year averaged $38,500.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,110	1,970	2,270

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Hospitals	74%
Health & Related Services	11%
Government	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
300	470	770

Nature of the Work

This group includes bank managers, loan managers, and senior financial managers such as comptrollers and vice-presidents of finance. Bankers not only lend money but are experts in management, marketing, industry and financial analysis. They oversee chequing and savings account services, loans, trust services and portfolio management, and provide financial advice to individuals and corporations. Comptrollers or other senior financial managers may be in charge of financial operations applying not only accounting but also tax, budgeting, and financial forecasting skills and knowledge.

As new technologies take over routine accounting and other financial information systems, financial managers increasingly tend to assist in the development of computer software applications. In the complex world of finance, these managers must act quickly, positively and accurately, and sometimes under a great amount of pressure. About 34% of financial managers are women, more than triple the number in 1971.

Education and Skills

These are not entry-level positions and are typically attained by internal promotion. A university degree in business administration, accounting, economics or commerce, and up to ten years previous work experience in junior management or accounting are usually required. Comptrollers and other senior financial managers in industries other than banking must have a professional accounting designation such as CA, CGA, or CMA. See the financial officers occupational group (SOC 1171) for further information on entry-level requirements.

Undergraduate programs are available at all B.C. public universities. A Master's of Business Administration (M.B.A.) is increasingly important. UBC and SFU offer a two year M.B.A., while UVic offers a master's in economics concentrating in finance.

SFU and UBC also operate two part-time/evening courses in cooperation with the Institute of Canadian Bankers. These are the two year Business Program for Bankers which leads to the designation Associate of the Institute of Canadian Bankers and the one year Professional Banking Program which leads to the designation Fellow of the Institute of Canadian Bankers.

Senior financial managers must be expert not only in financial management, but also in the operational requirements of their firm and its industry. Almost all are professional accountants with either the CA, CGA or CMA designation. Financial operations are so important now that the proportion of chief executives with financial backgrounds has risen substantially over recent years.

Financial managers must have an inquiring and logical mind, a capacity for hard work, excellent communication skills and the ability to work well with others.

B.C. Job Prospects

This large group employed over 7,300 workers in 1987, and is expected to show above average growth to 1995. The creation of 1,520 new jobs combined with 1,190 opportunities due to attrition is expected to raise total employment to over 8,800 by 1995 in B.C. The positive outlook primarily reflects anticipated growth in the finance, insurance and real estate industries, where 73% of financial managers work. The balance are spread throughout all industries.

Good employment prospects for these managers is partially due to deregulation of financial services and an increase in the number of such institutions. As the population increases, so does the number of people needing financial services and more financial officers will be required to serve them. Expanded corporate financial and auditing controls may also improve employment prospects for financial managers across all industries. Prospects are particularly good for credit managers and those specializing in computer systems.

Earnings

Top financial executives can make up to $90,000 plus, corporate controllers up to $67,000 and chief accountants up to $59,000. In 1986 the average employment income across all those in these occupations in B.C.was $37,600, and $39,400 for those working full-time over the whole year.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	6,070	7,320	8,840

Annual Growth 1987-1995: 2.4%

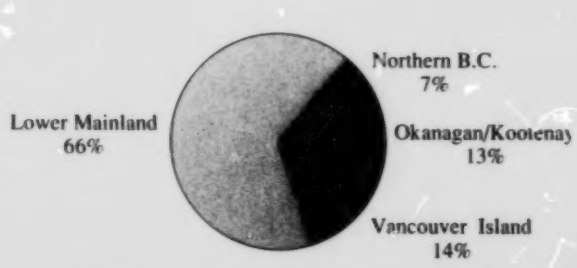
Main Industries of Employment 1986 Census

Finance, Insurance & Real Estate	73%
Retail & Wholesale Trade	6%
Government	6%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,520	1,190	2,710

Employment by Region



Personnel and Industrial Relations Management Occupations 1136

Nature of the Work

Included are employee relations managers, personnel department managers, and industrial relations directors who are responsible for using people effectively in organizations. They may set personnel and hiring policies; direct employee selection, training and evaluation; administer employee benefit plans; establish salary schedules; and participate in collective bargaining. They strive for a balance between compassionate treatment of employees and the organization's goals.

As the importance of human resources management becomes more widely recognized, these managers increasingly deal with employee morale, motivation, recreation, human rights, training and career development, planned staff reductions and flexible work arrangements. Early retirements, sabbaticals, work sharing agreements, employee re-training and re-deployment may also be concerns.

This occupation is widely spread among all industries in B.C. with emphasis in government (28%), hospitals and health services (12%), manufacturing (12%) and the retail and wholesale trade (10%).

Full-time, year-round, and a 35-40 hour week in an office setting, is the norm for this group. Women are increasing their presence and now constitute about 35% of those employed.

Education and Skills

These are not entry-level occupations and require a combination of education, in-house training and many years experience. Those interested in this field should refer to personnel and related officers (SOC 1174) for information on entry-level requirements and conditions.

Most personnel managers have an undergraduate degree in economics, business or specialized administration, psychology or sociology. Master's degree are sometimes preferred and knowledge of information processing systems is becoming important with increased computerization in this field.

UBC offers industrial relations within its Bachelor of Commerce and SFU offers a concentration in organizational behavior within its Bachelor of Business Administration. BCIT has a personnel and industrial relations option within its two year Business Administration Program, as well as a two year Industrial Relations Management Program. BCIT also offers a nine month course in human resource management systems for engineering and health technology graduates, or university graduates.

Excellent communication skills, patience to cope with conflicting views and the ability to function under pressure are needed. Integrity, fair mindedness and a persuasive personality are also important.

B.C. Job Prospects

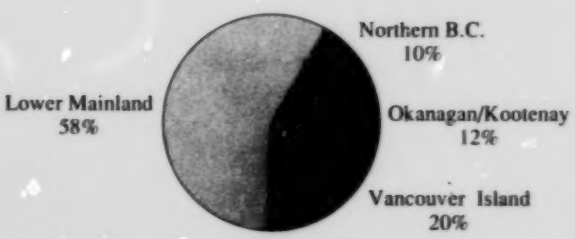
While this is a fairly large occupation, prospects are for slower than average growth to 1995. This isn't due to the prospects for a particular industry but reflects the trend to leaner work forces in large companies and the absence of personnel specialists in the faster growing, smaller companies. By 1995, there will be about 270 new jobs and 350 openings replacing retirees for total employment of 2,420. This group declined in number from 1981 to 1987 and it will nearly take to 1995 to reach the 1981 employment levels.

Although negatively affected by economic downturns, some in these occupations might be positively affected by the move to leaner organizations. Production rationalizations, layoffs and re-deployment of staff may increase demand for personnel managers. As well, stronger and broader skills and knowledge will be required to implement structural and technological changes.

Earnings

According to the 1986 Census, the average employment income for these occupations in B.C. was $36,200, and $40,400 for those working full-time over the whole year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,400	2,150	2,420

Annual Growth 1987-1995: 1.5%

Main Industries of Employment 1986 Census

Government	28%
Hospital & Health Services	12%
Manufacturing	12%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
270	350	620

Nature of the Work

This is the sixth largest occupational group in the B.C. economy, the largest group in the management category, and an occupation that is being changed by telemarketing and the growth of small business. Included are sales managers, advertising managers, advertising directors, marketing managers, and retail department managers in all kinds of industries. They use leadership and administrative skills to plan, organize, and coordinate retail, wholesale, insurance and real estate sales activities.

Sales and marketing managers may establish sales territories and quotas for their salespeople, develop and evaluate training and sales promotion programs, review market analyses, and may contact high volume purchasers personally to influence sales.

Advertising managers are responsible for their company's image in the marketplace. Working closely with production, design, financial,technical and marketing staff, as well as other managers, they plan and execute advertising campaigns.

Retail store and department managers are more concerned with sales and the day-to-day operations of their store or department, than with advertising and promotion.

Women have been increasing their participation over the past two decades and now account for nearly 30% of this occupational group.

Education and Skills

Like most managerial positions, these are not generally entry-level and most are reached after some blend of education and experience. Qualifications vary among industries and companies. For a career in technical sales, a relevant university degree or technical certificate is essential. In some areas, such as in real estate or financial securities, certain educational qualifications and licensing are compulsory. For further information on entry-level jobs see the sales occupations section (pp. 100-105).

Most individuals enter these occupations with an undergraduate degree in business, economics, psychology or sociology (50%) or a community college diploma or certificate in business and commerce, marketing or retail sales (30%). Some have completed a trade/vocational program in architectural design/drafting or management and administration.

B.C. Job Prospects

Sales management is a relatively new job. It was virtually non-existent in 1971, but has grown to the sixth largest occupation in the B.C. economy. Employment growth is expected to be average to 1995. About 4,350 replacement job openings and an additional 4,480 new jobs due to growth are anticipated over the outlook period, bringing total employment to almost 32,000 by 1995.

These jobs are most numerous in retail and wholesale trade firms, but exist in all sectors of the economy. Employment is fairly stable through the business cycle and throughout the year.

Telemarketing is changing sales, allowing selling and servicing of customers over the telephone with links to computer databases. Simultaneous management of sales/order processing, promotion/advertising, market research, and customer service is possible.

As the retail and wholesale trade industry becomes increasingly automated through computerized inventory control, sales records, and electronically processed orders, sales and advertising managers must keep up. While this has had little effect on employment levels, it has revolutionized the way work is done and the required skills.

Earnings

Salaries for advertising and sales promotion managers across Canada range from $23,600 to $66,000, averaging $39,400. Sales or branch managers average $36,100 and with commission and bonuses, this increased to $48,000. District sales managers earned an average of $39,800 and $58,900 with commission and bonus.

According to the 1986 Census, the average employment income for all those in this group in B.C. was $27,700 and $30,900 for full-time, whole-year workers.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	20,820	27,410	31,890

Annual Growth 1987-1995: 1.9%

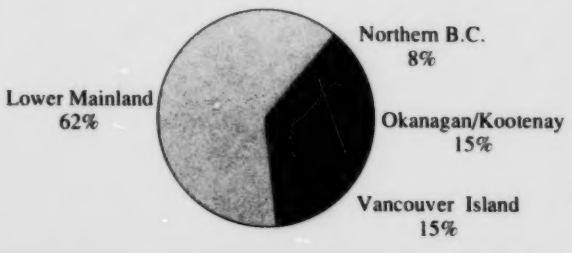
Main Industries of Employment 1986 Census

Retail & Wholesale Trade	74%
Manufacturing	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
4,480	4,350	8,830

Employment by Region



Nature of the Work

These jobs are primarily in the tourist industry (84%), and include club and lodge directors, restaurant managers and, most numerous, hotel and motel operators. Duties are similar in nature but vary enormously in complexity depending on the size of the establishment. Also included are managers of catering firms, automobile rentals and other equipment rentals.

Hotel managers set policy, establish marketing programs, plan advertising and promotional activities, organize and supervise staff, and control finances. In a large hotel they supervise up to 35 different trades and 12 different professions. They must coordinate other managers in charge of sales, rooms division, and food and beverages.

Management employment is usually full-time, year-round, and not generally affected by economic downturns. Working hours and days vary significantly among these occupations.

This is a large occupational group in B.C. which has grown so much that now the highest concentration amongst all provinces is here. Employment of women has also improved dramatically from almost none in 1971 to nearly 40% today.

Education and Skills

As with most management positions, these are not entry-level jobs; they are reached only after acquiring extensive experience. In general, high school graduation with post-secondary education, and three to ten years of experience is required. It is now suggested that future hotel managers be educated in accounting, budgeting, planning, cost control and finance.

BCIT, the Open Learning Agency and various colleges offer programs in Hotel, Motel, and Restaurant Management. Grade 12, with English 12 and Algebra 11, is required and preference is given to those with industry experience. Other related college programs are Ski Area Management, Golf Course Management and Tourism Management.

Most individuals who enter the occupation have a university degree (55%) in business or hotel administration, a community college diploma or certificate (27%) in hotel or food service management, or a vocational certificate (18%) in business or cooking.

Successful managers must have a genuine liking for people, excellent communications skills and have an intimate knowledge of the workings of their organization.

B.C. Job Prospects

From 1971 to 1987, there was significant employment growth in the fields of hospitality and miscellaneous services. Employment growth to 1995 is projected to be slightly lower than the all-occupation average. However, about 4,150 job openings will occur over this period; the high turnover of workers due to retirement and other reasons will contribute approximately 70% of this.

During recessions, job losses in these occupations should be relatively few, while general economic growth will increase demand as businesses require conference and accommodation facilities.

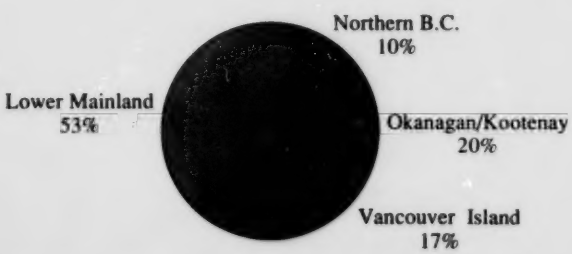
Technology is being increasingly utilized for accounting in small hotels as it has been for large hotels. Related applications such as stock control, kitchen production, reservations, room allocation, room service and billing are also increasingly computerized. Although this eliminates routine tasks, the overall impact of new technology on management employment will be minimal.

Earnings

The average annual salaries of hotel managers vary significantly by size of hotel. A front office manager averages $22,000 in a 200-350 room hotel, $26,000 for 350-500 rooms, and $28,000 for more than 500 rooms.

According to the 1986 Census, the average employment income in these occupations in B.C. was $17,900, and $20,800 for those working full-time over the whole year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	7,200	9,510	10,780

Annual Growth 1987-1995: 1.6%

Main Industries of Employment 1986 Census

Accommodation & Food Services 84%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,270	2,880	4,150

Nature of the Work

This occupational group includes a variety of senior management jobs in fields such as publishing, newspapers, professional associations, recreational or cultural organizations (like the Pacific National Exhibition, the Vancouver Aquarium or the Symphony), real estate firms, and public utilities (like B.C. Hydro). The function of these managers is to plan, organize, direct and control the many diverse and inter-related functions of a company or complex in order to ensure that either a product is produced, for example, a newspaper, or, that the business of the organization runs smoothly, for example, offices are fully rented or exhibition facilities are kept up-to-date and are competitive.

Junior executives, who are on a developmental path toward these types of management positions, are often included in this group.

These jobs use a variety of management skills from dealing with a board of directors, setting and monitoring budgets, supervising other managers or administrators, communicating with people at all levels, to motivating employees and setting policy for development of the organization.

The proportion of women found in this field has been increasing and in 1986 women comprised 47% of all those employed in this field.

Education and Skills

As with most managerial positions these jobs are normally achieved after several years of work in other professional or administrative occupations and most people who enter this field have above average educational qualifications. Typical credentials may be an M.B.A. or commerce degree, an accounting qualification, or an engineering or scientific background followed by specialized business or management courses. All the public universities in B.C. offer a range of degree programs which might, in time, lead to this management level.

A few of the specific occupations do call for more specific credentials. For example, to become a Certified Property Manager (CPM) requires five years experience and completion of the Real Estate Institute of Canada Program. This normally comes after obtaining a degree or college qualification in business administration with some specialization in real estate and property appraisal studies.

B.C. Job Prospects

This whole job field is very large with employment expected to be over 20,000 by 1995. New job growth of 2,510 and replacement needs of 3,800 will provide many opportunities. One must remember that there is a wide variety of different fields and different industries reflected within this group. Therefore the prospects in each may vary because of the very great diversity of settings and demand for products or services from various industries. Growth of smaller organizations or businesses or the opening of new businesses is also expected to be important as a source of management jobs. This may lead to even more opportunities than the number currently forecast for this field.

Managers and administrators are found in all industrial sectors. However, the predominant industries of employment for persons in this occupational group are finance, insurance and real estate, which reflects a major real estate management component; business services; and government. The majority of employment is full-time, full-year but there is a significant component of project oriented activity where employment only continues for the duration of a project. Individuals in this field may also be self-employed.

Earnings

Employment earnings, reported by the 1986 Census, for full-time, full-year workers in this field in B.C. were $31,800. The spread of earnings is considerable because of the diverse nature of work in this occupational field.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	n/a	17,520	20,030

Annual Growth 1987-1995: 1.7%

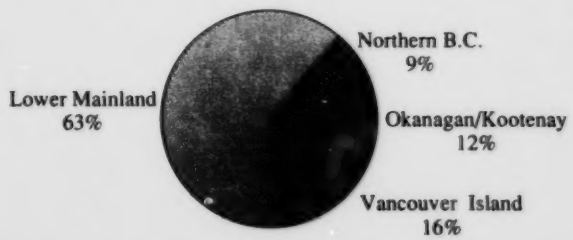
Main Industries of Employment 1986 Census

Finance, Insurance & Real Estate	11%
Business Services	10%
Government	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,510	3,800	6,310

Employment by Region



Nature of the Work

Financial officers prepare, analyze, and verify financial reports that furnish information to managers. Accountants dominate this group but auditors, underwriters, tax consultants, loan advisors, investment analysts, and foreign exchange traders are also included.

Chartered Accountants (CAs) provide tax consulting, estate planning, accounting, auditing, financial advice and act as trustees in bankruptcy. About half work as public accountants, where auditing and tax planning are emphasized. About one-quarter of Certified General Accountants (CGAs) are in public practice, providing similar services. Most Certified Management Accountants (CMAs) work in business and government.

The number of women doubled from 1981 to 1986 and now constitute over 40%. Employment is usually full-time, year-round, with a 35-40 hour week. Overtime is likely during the tax season or for special projects.

This group is affected by technological change, thus familiarity with computers and accounting programs is needed. Some even develop extensive computer skills, specializing in software systems and developing programs to meet special needs.

Education and Skills

CA applicants must have a degree or be a mature student, complete courses, and obtain employment with a chartered accounting firm. Three years of articles, more courses and a final examination are required for the CA designation.

CGA applicants must have Grade 12 or be a mature student and new students must have microcomputer access. Diploma or degree holders may directly enter the CMA program; two years of professional experience follow. Grade 12 graduates complete a one to three year program and one year of experience before the professional program.

Auditors usually train as CAs, CGAs or CMAs. BCIT and community colleges offer a one to two year Accounting Management Program which include auditing. Public auditors must be CAs or CGAs.

Financial analysts usually have a degree in commerce or economics but a MBA and/or CA/CGA/CMA may be required. Investment analysts and foreign exchange traders require the Canadian Securities Institute Course and the Registered Representative Examination. Institute of Chartered Financial Analysts courses are also recommended. Most financial planners have insurance, securities or accounting backgrounds. BCIT offers personal financial planning in its Financial Management Program. The Canadian Institute of Financial Planning, in Toronto, offers a correspondence program leading to the designation, Chartered Financial Planner.

Financial managers must have an inquiring and logical mind, and have excellent communication skills.

B.C. Job Prospects

This group is one of the largest in B.C. and by 1995 will employ over 24,000 people. Nearly 7,400 employment opportunities will open; about half of these will be new jobs. Net employment growth is projected to be above average.

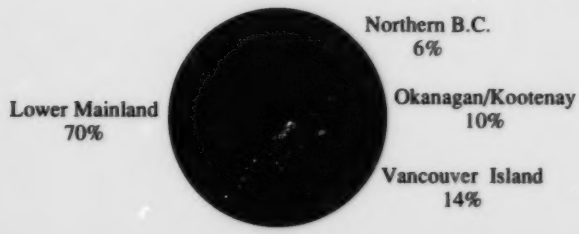
Public accounting employs about 30%, either through accounting firms or self-employment. Nearly 30% more are employed in finance, insurance and real estate and about 10% work in government. The rest are distributed throughout business and industry. Employment is not generally sensitive to economic downturns.

Technology has affected the work and services provided. It also tends to emphasize planning, information services, computerized banking and investment systems. Almost all new entrants must be computer literate.

Earnings

Salaries across Canada in 1986 for senior auditors ranged from $29,600-$49,700; auditors $24,000-$35,200; cost accountants $20,800-$36,000; and assistant cost accountants $19,600-$23,300. Partners and senior auditors in public accounting may earn over $100,000. B.C. average employment income was $29,900 according to the 1986 Census, and $34,900 for full-time, full-year workers.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	14,840	20,700	24,470

Annual Growth 1987-1995: 2.1%

Main Industries of Employment 1986 Census

Business Services	30%
Finance, Insurance & Real Estate	27%
Government	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
3,770	3,630	7,400

Nature of the Work

Personnel administrators include personnel assistants, employee relations specialists, industrial relations officers and employment counsellors. Primarily concerned with the productivity of people in an organization, the personnel administrator determines staff requirements; analyses job specifications; prepares job descriptions; advertises vacancies; interviews and tests candidates; organizes employee training and development; and helps develop personnel policies and practices. Where a collective agreement is in force, the personnel administrator is usually involved with contract negotiations and implementation of the agreement.

Education and Skills

These occupations usually require a bachelor's degree in psychology, sociology or business administration, although graduate degrees are becoming more prevalent; a minimum of two years on-the-job experience, including in-house training programs; and completion of specialized courses or programs offered by universities and colleges. Competition for entry-level positions is keen, so part-time or summer experience in a personnel office is an asset.

UBC offers Industrial Relations Management within its Bachelor of Commerce program. SFU offers a choice of Industrial Relations, Personnel or Organizational Development within its Bachelor of Business Administration program. BCIT has a Personnel and Industrial Relations option within its two year Business Administration program and a two year Industrial Relations Management program which requires Grade 12. It also has a nine month program in Human Resource Management Systems for engineering and health technology graduates or university graduates. All colleges offer one to two year business administration programs which include personnel related courses.

There are many educational opportunities offered through various continuing education divisions. These include SFU/Downtown's Management Skills in Advanced Technology and Certified Employee Benefit Specialist Program; Douglas College's course on Computerized Personnel Information Management Systems; and the Justice Institute's courses in mediation and conflict resolution.

Excellent oral and written communication skills, and the ability to work on a team are important. Personnel officers should be able to establish rapport with people of all educational and occupational backgrounds. Knowledge of computer storage and processing systems is becoming important with increased computerization in this area.

B.C. Job Prospects

Although job growth was above average between 1981 and 1987, projections to 1995 call for jobs to grow more slowly than average. This outlook is based on the expected employment performance in the government administration, services and manufacturing sectors. Personnel officers make up a fairly large job group in B.C. with the number employed in 1995 expected to be about 4,300. This includes an estimated 1,100 job openings expected over the projection period, with 690 resulting from the need to replace personnel who leave. In 1987, unemployment was low, suggesting that current labour market conditions are more favourable than for most occupations.

Continued use of more sophisticated and more extensive human resource planning in industry will contribute to job growth. Although widely distributed across all industries, the majority work in government; business and miscellaneous services; and finance, insurance and real estate. There is no seasonal variation in employment and opportunities for part-time work are less than in the labour market at large. More and more women have chosen this profession over the last several years, with their representation increasing from 22% to 50% between 1971 and 1986.

Earnings

The average annual employment income in B.C. was approximately $27,500 in 1986. Sixty-nine percent were employed full-time, full-year, and these workers' incomes averaged $33,500.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,360	3,850	4,270

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Government	39%
Business/Miscellaneous Services	15%
Finance, Insurance & Real Estate	6%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
410	690	1,100

Employment by Region

Occupations Related to Management and Administration 1179

Nature of the Work

This occupational group is very wide. It includes many different occupations involved with management or administration where it is important to have a good knowledge of a particular field or to be capable of independent action. Typical jobs within this field are public relations officers, information officers, business consultants, promoters and various agents (business agents, publicity agents, contract agents and others). Travel agency managers and tour operator/managers, conference planners and community arts organizers are among the newer management occupations identified in this field. People in this field usually work in pleasant office surroundings, but often travel to meetings and various promotional or other functions.

Education and Skills

Candidates for positions in this diverse occupational grouping should be articulate, imaginative and possess some related post-secondary education. A broad liberal arts or commerce education at the undergraduate level may need to be augmented by wide experience in fields such as communications, journalism, or other media work before moving into this management field. In-house training and continuing education is also important.

SFU offers a Bachelor's program in Communication; BCIT offers an 11 month Public Relations Program and a two year Marketing Management Program. Other colleges offer writing/editing and communications courses, which may have public relations options. In response to increased attention to the Pacific Rim, Vancouver Community College and Camosun College offer a Pacific Rim option in the Business Administration Program, and Capilano College offers an International Education Program for those who already have a degree or diploma.

Interpersonal and communication skills are essential, as personal contact and communication are basic to all these public oriented jobs. Many work situations call for a considerable amount of persuasiveness. Other desirable traits include an out-going nature, sound judgment and an ability to work under time pressure or other stress.

B.C. Job Prospects

Employment growth was very strong from 1981 to 1986 as many of the newer occupations described for this field became more important in fast growing business services, tourism and recreation industries. The projected growth is quite close to the average for all industries, but the final growth realized by many of the occupations within this group may well be much higher by 1995. The number of people employed within this occupational group makes it a large field within the B.C. economy. Total employment in 1995 is conservatively projected at 8,970 and job openings of about 2,660, including growth and replacement are expected.

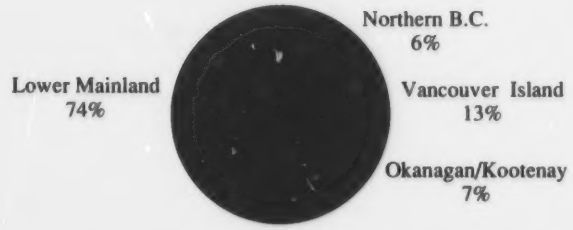
Occupations in this group occur across the whole spectrum of industries; some concentration is found in business services, miscellaneous services and government. A person employed in one of these occupations can generally expect stable, full-time employment, although the possibility for part-time employment has increased. There is also an increase in self-employment and contract work which places more emphasis on the individual's capacity to use entrepreneurial skills to maintain employment.

Earnings

Because of competition, starting earnings tend to be low. In some fields, or with experience and advancement to a position of responsibility, salaries are higher.

The 1986 Census showed that the average employment income for full-time, full-year workers was $33,600 in B.C.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,400	7,940	8,970

Annual Growth 1987-1995: 1.5%

Main Industries of Employment 1986 Census

Business Services	19%
Miscellaneous Services	16%
Government	12%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,020	1,640	2,660

21

Occupations in Natural Sciences, Engineering and Mathematics

▶ Chemists 2111

Nature of the Work

Chemists conduct research into the chemical nature of substances, with the aim of either increasing chemical knowledge (basic research) or developing improved materials and processes (applied research). Their research has provided the basis for advances in medicine, agriculture and the development of a variety of new and improved synthetic fibers, paints, adhesives, drugs and electronic components. They also develop processes which help save energy and reduce pollution, such as improved oil refining methods. Chemists often specialize in a subfield of chemistry. These include organic, inorganic, physical, analytical, theoretical and clinical chemistry.

Chemists working in private industry are found in product development and quality control as well as in marketing and sales where they sell and provide technical information on chemical products. Chemists also hold teaching/research positions in universities and colleges. Chemists usually work regular hours in offices and laboratories.

Education and Skills

Four year Bachelor of Science programs in chemistry are available at UBC, SFU and UVic, which is the minimum educational requirement for many beginning jobs. A concentration in science and mathematics at the high school level is necessary. Master's and doctoral programs are also offered at each university. Chemists with a master's degree can usually teach at the college level or go into applied research in government or private industry. A Ph.D. is required for basic research, for university faculty positions and for advancement to many administrative positions (see also profiles SOC 2711 and SOC 2791).

Students planning careers as chemists should like working with their hands, building scientific apparatus and performing experiments. Perseverance, the ability to concentrate on detail and to work independently are essential.

B.C. Job Prospects

The employment outlook for chemists calls for below average growth into the mid-90s, based on the outlook in the manufacturing, services and public administration sectors. This is a small occupational group in B.C. and during the projection period, about 100 new positions and 90 replacement openings are anticipated for a total provincial employment of 890 workers in 1995. In 1987 unemployment among chemists was much lower than the average for all occupations, suggesting that current labour market conditions for chemists are more favourable than for most occupations. The main areas of employment for chemists in B.C. are in professional scientific services, teaching/research, and mining or processing of metals.

Technological change has had little effect on employment in this occupation. An important factor affecting job opportunities, however, is the funding available for chemical research and development. The chemistry field is not as susceptible to changing business conditions as other occupations. Employment is mostly full-time and employment of women in this occupation has more than doubled from 14% to 32% between 1971 and 1986.

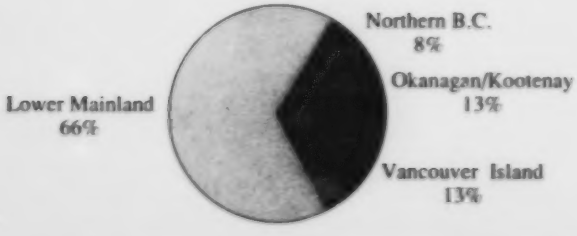
Earnings

The average annual employment income for chemists in B.C. was approximately $28,200 in 1986. Almost 70% worked full-time, full-year, and these workers' earnings averaged $34,700.

Related Occupations

Technical Writers and Manufacturers' Sales Representatives.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	880	780	890

Annual Growth 1987-1995: 1.6%

Main Industries of Employment 1986 Census

Business Services	22%
Education	13%
Metal Processing	12%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
100	90	190

Nature of the Work

Geologists study the physical aspects and history of the earth. Specific activities depend on the specialization which includes geochemists, geophysicists, hydrologists, mineralogists, oceanographers and seismologists.

Exploration geologists and geophysicists often work overseas or in remote areas, and oceanographers may spend considerable time at sea. Geologists in the mining industry may examine mineral occurrences and map the geology of company claims, or plan and supervise general exploration projects.

Many geologists' work involves assessing sites for resource exploration and the construction of highways and bridges. When not working outdoors, geologists are in offices and laboratories preparing reports and maps.

Education and Skills

A bachelor's degree in geology is adequate for entry into some lower level jobs, but better jobs with good advancement potential usually require at least a master's degree. A Ph.D. degree is often required for appointment to federal or provincial surveys and for research and academic positions (see also profile SOC 2711).

With the increasing application of high technology to this field, mathematics and computer skills are needed. UBC has a four year Bachelor of Science Program in Geology. Grade 12 graduation with Chemistry 11, Algebra 12, Physics 11, and a science 12 is required for admission. UBC also offers master's and doctoral programs in geology.

Geologists need to be able to work as part of a team. They should be curious, analytical and able to communicate effectively. Those involved in field work must have physical stamina.

B.C. Job Prospects

Although jobs for geologists declined between 1981 and 1987, projections to 1995 call for jobs to grow much faster than the average for all occupations. However, this is a small job group in B.C. with the number of jobs in 1995 expected to be about 940. This includes an estimated 190 new job openings and 60 replacement opportunities expected over the projection period. Unemployment is about average and suggests that job seekers and jobs are fairly evenly matched.

Employment in B.C. is concentrated in professional scientific services, the mineral mining industry and the provincial government. Deep sea exploration and research should continue to support the demand for oceanographers. As concerns for environmental protection increase, engineering and environmental geologists will be required to evaluate hazards and recommend solutions to pollution problems. While openings may be created by the search for new sources of energy, the advent of efficient electronic prospectors and sophisticated aerial detecting devices may reduce the relative need for geologists.

Most geologist jobs are full-time, with peak employment through the warm weather months of the year. More and more women have chosen this profession over the last several years, with their representation increasing from 1% to 10% between 1971 and 1986.

Earnings

The average annual employment income of geologists in B.C. was approximately $30,700 in 1986. Fifty-five percent of this work force was employed full-time, full-year, and these workers' earnings averaged $44,200.

Current (1989) wages for entry-level geologists range from $1,900-$2,400 per month (non-union) and $1,925-$2,500 (union). Monthly wages for experienced geologists range from $2,400-$3,200 (non-union) and $2,300-$3,500 (union).

Related Occupations

Mathematicians, Computer Scientists and Cartographers.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	890	750	940

Annual Growth 1987-1995: 2.9%

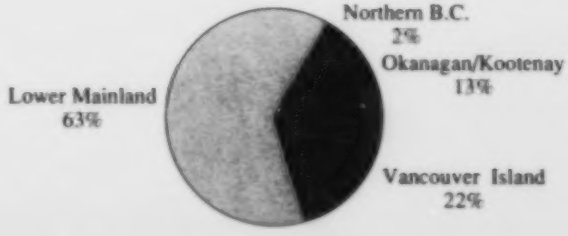
Main Industries of Employment 1986 Census

Business Services	42%
Mining	40%
Government	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
190	60	250

Employment by Region



▶ Meteorologists 2114

Nature of the Work
Meteorologists are involved in the study of climatic conditions. The most familiar application of this knowledge is in understanding and forecasting the weather, but much of this work has applications in air pollution control, fire prevention, agriculture, air and sea transportation and the study of trends in the earth's climate.

Meteorologists who forecast the weather are the largest group of specialists. They study weather information and apply physical and mathematical relationships to make predictions. Other meteorologists engage in basic and applied research. For example, climatologists study trends in climate and these studies are used to plan heating and cooling systems, design buildings and aid in effective land utilization.

Most weather centres are at airports or in or near cities, but some are in isolated and remote areas. All meteorologists rely heavily on computer and data processing facilities.

Education and Skills
Grade 12 with sciences and mathematics, followed by a four year bachelor's degree in physics and mathematics at any of B.C.'s three public universities is the minimum requirement.

UBC offers a Diploma in Meteorology for students who wish to direct their experience to environmental applications or to work as a meteorologist. It is an intensive one year program and admission requirements include the above as well as a background in computing science. The major employer of meteorologists, the federal government, requires new recruits to complete a nine month training program. Other qualifications include good interpersonal skills, an aptitude for detailed work, concentration and good judgment.

B.C. Job Prospects
This is a very small job group in B.C. with the number of jobs in 1995 expected to be less than 180. This includes an estimated 10 new job openings and 10 replacement opportunities expected to 1995, and reflects a slower than average growth rate when compared to all other occupations. In 1987 unemployment among meteorologists was much lower than average, suggesting that current labour market conditions for this job are more favourable than for most occupations.

The majority of meteorologists in B.C. are employed by the federal and provincial governments. Although job losses are unlikely to occur during a recession, this occupation is vulnerable to government spending decisions. If federal and provincial expenditures continue to decrease in this area, job openings will be limited. Increasing use of subcontractors and external services may stimulate job opportunities in business services. Meteorologists' work is mostly full-time and reasonably stable throughout the year.

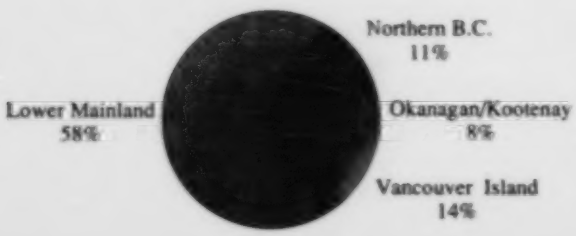
Public concern for pollution may expand career possibilities for industrial meteorologists. New information systems may also increase the demand for these people. As more detailed and specialized information becomes available, meteorologists are able to advise chemical and agricultural consultants on weather and soil conditions.

Earnings
In 1986, 83% of the meteorologists in B.C. were employed full-time, full-year and their average annual earnings were approximately $40,400.

The salaries of junior meteorologists employed by the federal government in 1986 ranged from $16,696 to $24,144; mid-level jobs paid from $34,539 to $43,009 and senior positions from $49,009 to $59,960.

Related Occupations
Conservation Scientists, Environmental Engineers and Foresters.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	130	160	170

Annual Growth 1987-1995: .9%

Main Industries of Employment 1986 Census

Federal Government	67%
Provincial Government	12%
Business Services	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
10	10	20

2117 Physical Sciences Technologists and Technicians

Nature of the Work

In research and development, science technicians construct or maintain experimental equipment, set up and monitor experiments and calculate and record the results. In production, science technicians follow the general directions of scientists and engineers, often without close supervision. Many do quality control testing. With experience and initiative, individuals may move into other positions such as supervisor in a production plant, research project assistant or sales representative.

Science technicians usually specialize in a particular area and have a specific job title. These include ballistics technician, chemical laboratory analyst, pollution control technicians, food technologist, metallurgical tester and pulp and paper technician.

Education and Skills

Although some technicians have a bachelor of science degree, the basic requirement for this occupation is completion of a two year program at an institute of technology after graduation from high school. BCIT offers a two year Chemical Sciences Diploma Program which has options in metallurgy, environmental science and pulp and paper. Also available are Biotechnology and Food Processing Programs which prepare students for work in food research laboratories and biochemical production facilities. UBC's Faculty of Agricultural Sciences offers bachelor's and graduate programs in Food Science with specializations in food chemistry, food microbiology or food processing science. Employers may also provide on-the-job training that lasts from one to twelve months, depending on the specialty and the individual's background.

Science technicians should have an aptitude for science and mathematics as well as good oral and written communication skills. They should also be able to work well with others since technicians often are part of a team.

B.C. Job Prospects

Although jobs in these occupations declined between 1981 and 1987, projections to 1995 call for jobs to grow about as fast as the average for all other occupations. This is a medium size job group in B.C. with the number of jobs in 1995 expected to be about 1,230. This includes an estimated 150 new job openings and 150 replacement opportunities expected over the projection period. Unemployment was well above average in 1987, suggesting that competition for job vacancies may be stiff.

Business services, government and research institutions are where most of these workers are employed in B.C. The continued demand for goods containing chemical products, particularly non-agricultural chemicals, is expected to support employment growth. As with scientists, demand for technicians and technologists is sensitive to government funds for research projects and the level of private sector activity in research and development projects.

In mining, technological innovations such as robot drills may reduce demand for certain technicians. Biochemistry, on the other hand, should offer better prospects, since this is an area of continuing growth. Automatic analyses and computerization of test records may reduce the work of the technician in some cases, while other complex and technological developments will require more knowledgeable and experienced technicians and technologists.

The number of women in this occupation increased significantly from 17% to 33% between 1971 and 1986. Opportunities for part-time work are less than in the labour market at large.

Earnings

The average annual employment income of this job group in B.C. was approximately $23,300 in 1986. Fifty-four percent of this work force was employed full-time, full-year, and these workers' earnings averaged $32,000.

Physical science technologists employed by the federal government earned between $20,049 and $22,229 per annum in 1986-1987. Those at a senior working level (Technical Support V) received between $27,378 and $30,635 per annum.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,450	1,080	1,230

Annual Growth 1987-1995: 1.7%

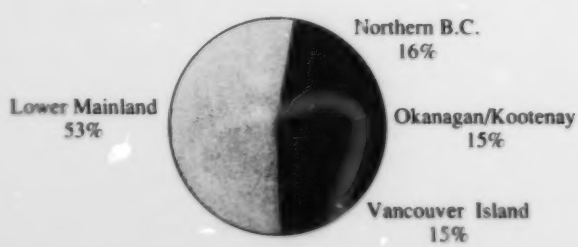
Main Industries of Employment 1986 Census

Business Services	26%
Government	21%
Education	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
150	150	300

Employment by Region



Nature of the Work

Agriculturalists study animals, plants, soil composition, water conservation and farm management to develop ways of improving the quality and quantity of farm products. Also known as agronomists, they may increase field crop yields by improving growth methods and controlling diseases, pests and weeds. Included are horticulturalists who work with orchard and garden plants, including flowers, to beautify as well as improve production. Soil scientists study soil characteristics, determine the best types of crops for each soil, improve soil management and conservation. Animal scientists do research on the breeding, feeding, and diseases of domestic farm animals. Some agriculturalists manage research and development projects, marketing or production operations in companies that produce agricultural chemicals, feed, seed or machinery.

In B.C. over 40% of this group work in companies in the forest industry. Some 23% work in government and 14% in agriculture. There is some seasonal employment but very little part-time work. With 16% of Canada's agricultural scientists working in B.C., we have proportionately more than any other province.

Although men continue to be in the majority for this occupation group, women are increasing. They constituted 4% in 1971, 13% in 1981 and 16% in 1986.

Education and Skills

For employment in these occupations, either a four year bachelor's degree in agriculture/plant science or a two year community college diploma is required. UBC offers a Bachelor of Science in Agriculture with specializations in animal or plant science (including horticulture), soil science, rangeland resources, agricultural economics and bioresource engineering. There is an optional cooperative education program incorporating paid work/study periods in the summer. Postgraduate programs are also available at UBC.

A two year college program in agriculture technology is available and several colleges offer diploma programs in horticulture. BCIT offers a two year Biological Sciences Technology Diploma in Bioengineering.

Agricultural scientists should be able to work independently or as part of a team and must be able to communicate their findings clearly and concisely, both orally and in writing. Farm experience is an advantage.

B.C. Job Prospects

Total employment in this medium size occupational group declined from 1981 to 1987. Some growth is expected to 1995 but it is likely to be below-average based on the employment prospects in government and in the forest sector where most are employed. About 110 new jobs will be created by 1995 and about 140 more will occur as scientists retire or otherwise leave the field. However, if increased emphasis is placed on reforestation over the next few years more new jobs would be created.

Growing concerns about pollution, environmental protection and biotechnical research will provide new opportunities for agriculture scientists in government and business. Those with a high degree of skill and knowledge, with expertise in related disciplines and with computer skills will have the edge.

Since the age structure is young, new jobs will be restricted to entry-level positions for new graduates. Some openings will occur as government contracting out increases. Others will arise in forestry companies and companies doing business with farmers, such as processing and marketing firms, or banks.

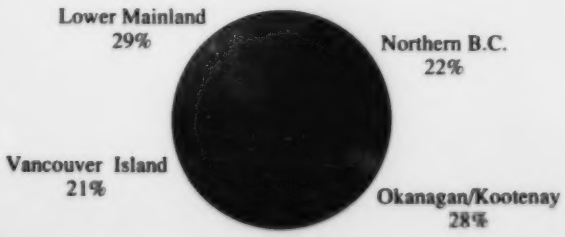
Earnings

Nationally, 1985 starting salaries ranged from $21,700 to $24,600 for B.Sc. graduates and from $25,500 to $26,700 for postgraduates.

In 1986 federal government entry-level salaries ranged from $24,800 to $28,700; $55,800 to $61,400 for senior levels; and $62,600 to $70,700 for management. Salaries for established agrologists in industry can exceed $100,000.

According to the 1986 Census, in B.C. the average for this group was $29,700, and for full-time, full-year workers, $37,300.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,100	960	1,070

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Forestry	41%
Government	23%
Agriculture	14%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
110	140	250

Nature of the Work

Biologists work in zoology, the study of animals, and botany, the study of plants. They include anatomists, aquatic biologists, biochemists, ecologists (or environmental biologists), geneticists, medical bacteriologists, microbiologists, pathologists, pharmacologists, plant physiologists and zoologists. They all study living organisms and the relationship of animals and plants to their environment. Theoretical or research biologists usually divide their time between field work, collecting information on living and fossil organisms, and laboratory research. Applied biologists may inspect food and drugs, conduct surveys on marine life and advise on its management and control. Biotechnology, which involves recombining the genetic material of animals or plants, has opened up new commercial applications of biological science. An increasing portion of the world's drugs, food and chemicals will probably be produced using biotechnology processes.

Education and Skills

An undergraduate degree in either biology, zoology or botany is usually required in this occupation. A four year Bachelor of Science in Biology is available at all three public universities. Options include cell biology, genetics, marine biology and ecology. UBC also offers a bachelor's degree in Aquacultural Science. All three public universities offer courses dealing with aquatic resources and aquacultural systems through various departments, including marine science courses at the Western Canadian Universities' Marine Biological station at Bamfield on Vancouver Island. Admission requirements include a strong background in high school biology, and Algebra 12 is strongly recommended. Two year university transfer programs in biology are available at most community colleges.

Biologists with a master's degree can usually teach at the college level or go into applied research in government or private industry. A Ph.D. is required for basic research, for university faculty positions and for advancement to many administrative positions (see also profiles SOC 2711 and SOC 2791). Biologists should be able to work independently or as part of a team and must be able to communicate their findings clearly and concisely.

B.C. Job Prospects

Although job growth in this occupation was well above average between 1981 and 1987, projections to 1995 call for jobs to grow more slowly than the average for all occupations. This is a medium size occupational group in B.C. with the number of jobs in 1995 expected to be over 1,400. This includes an estimated 100 new job openings and 150 replacement opportunities expected over the projection period. Unemployment in 1987 was well below average, suggesting that current labour market conditions for biologists are more favourable than for most occupations.

The majority of biologists work in Ontario and Quebec, although B.C. has the highest concentration of biologists per capita. In B.C., most are employed by the provincial government, in the fishing industry and in business services. Employment demand in provincial administration and education is affected by government research expenditures. Biotechnological research should offer new opportunities in both the private and public sectors.

The Task Force on Human Resources for Biotechnology has reported a shift toward interdisciplinary programs combining systems engineering with microbiology and other scientific specialties. Graduates with multidisciplinary backgrounds should therefore have little difficulty finding employment. At the national level, a shortage of biologists with a Ph.D. exists for research. More and more women have chosen this profession over the last several years, with their representation increasing from 19% to 35% between 1971 and 1986.

Earnings

The average annual employment income of this job group in B.C. was approximately $26,800 in 1986. Sixty-one percent of this work force was employed full-time, full-year, and these workers' earnings averaged $34,100.

Starting salaries for entry-level jobs in the federal government ranged from $17,354 to $30,983 in 1986. Top positions paid from $40,355 to $48,983.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,110	1,310	1,410

Annual Growth 1987-1995: .9%

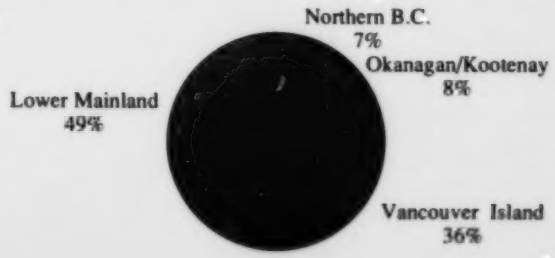
Main Industries of Employment 1986 Census

Provincial Government	23%
Fishing	18%
Business Services	17%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
100	150	250

Employment by Region



Nature of the Work

Life science technologists and technicians use their knowledge of science, mathematics and technical processes to assist scientists in research and development and in production-related tasks. Areas of specialization for life science technologists include seed analysts, soil technologists, forest technologists, agricultural technicians, botanical technologists and aquaculture technologists. Their work may range from laboratory experimentation and operation of special test equipment, to preparation of specifications and scientific reports to outdoor field work.

Aquaculture technologists work in fish hatcheries or on fish farms, raising fish in man-made environments for restocking lakes and streams or for commercial sale.

Education and Skills

People working as life sciences technologists often have a bachelor's degree, although the minimum education requirement for these occupations is graduation from a community college or technical institute program.

Training for aquaculture technologists is available in a two year program at Malaspina College, which also offers a one year accelerated program for those with a bachelor of science degree. Other aquaculture programs and courses, including a one year Fish Health Technician Program, are also available at various colleges.

Forestry technologists usually complete the two year college program in forest resource technology. Other programs available are resource management technology and wood products manufacturing technology. The latter prepares students to work with the advanced technology being adopted in the production of lumber and plywood. These programs are available at BCIT and several community colleges.

BCIT also offers two year Biological Sciences and Agriculture Technology. Camosun College offers an Applied Biology Program.

In addition to an aptitude for science and math, life science technicians should be able to work well with others since they are often part of a team.

B.C. Job Prospects

Jobs in this occupational group declined between 1981and 1987 and projections to 1995 call for jobs to grow more slowly than the average for all occupations. This is a small job group in B.C. with the number employed in 1995 expected to be about 890. This includes an estimated 150 total job openings, with the majority resulting from the need to replace existing personnel who leave.

In B.C., most of these workers are employed in forestry, government and research institutions. The portion employed in the fishing industry has nearly doubled between 1981 and 1986.

Employment in these occupations fluctuate according to government spending decisions as well as research and development spending in the private sector. Increasing silviculture and aquaculture activity should give persons in these fields better prospects, while other areas will remain more competitive. Prospects also appear to be good for technologists in the area of quality control in fisheries. Candidates with computer-related, diagnostic skills and multi-disciplinary design or development will be at a definite advantage.

Part-time workers are fewer than in the labour market at large, and seasonal forces cause employment to peak during the warm months of the year. In 1986, women held 31% of all jobs.

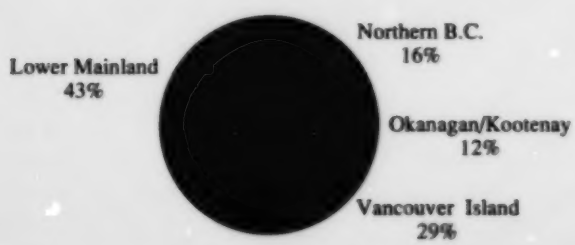
Earnings

The average annual employment income of this job group in B.C. was approximately $20,100 in 1986. Only 42% were employed full-time, full-year, and these workers' earnings averaged $31,200.

Related Occupations

Engineering Technicians and Health Technologists.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,050	820	890

Annual Growth 1987-1995: 1.0%

Main Industries of Employment 1986 Census

Forestry	27%
Government	26%
Education	13%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
70	80	150

Nature of the Work

This classification includes naturalists, silviculturists and foresters. Foresters plan and supervise the growing, protection and harvesting of trees. They map forest areas, estimate the amount of standing timber and future growth and manage timber sales. Foresters also protect the trees from fire, harmful insects and disease. Some protect wildlife, develop and supervise camps and parks, or protect wildlife. Foresters supervise the work of technologists and technicians, and are often asked to advise people in industry, government and the general public. This may include running educational programs on forest care. Although the work can be physically demanding and take place in remote areas, foresters deal regularly with landowners, loggers, forestry technicians, farmers and ranchers.

Education and Skills

A four year bachelor's degree in forestry is usually required, although some positions may require a post-graduate degree. Complementary knowledge of geology, engineering, biology and economics is desirable. Two years on-the-job training is a requirement for registration with the Association of B.C. Professional Foresters in Vancouver.

UBC has bachelor's and graduate degree programs in Forest Resources Management, Forest Harvesting, Forest Science and Woodscience and Industry. Admission to a bachelor's program in forestry requires either completion of first year university science or high school graduation with a strong background in math and science.

Forestry students should try to obtain relevant summer work experience, preferably in their area of specialization. Foresters and conservationists must enjoy working outdoors, be physically hardy and be willing to relocate. They must also be able to work well with people and have good communication skills.

B.C. Job Prospects

The rebound of production levels in the entire forest industry of B.C. is reflected in current industry-wide employment figures of 85,000, which are nevertheless still well below peak 1981 levels of 110,000. Although the number of foresters employed is back up to pre-recession levels, overall projections to 1995 for foresters and other occupations in the life sciences call for jobs to grow more slowly than average. This is a medium size occupational group in B.C. with the number employed in 1995 expected to be about 1,250, including an estimated 120 new job openings and 120 replacement opportunities expected over the projection period.

The current recovery in forestry output is anticipated to be sustained under the Free Trade Agreement with the U.S., cementing the markets B.C. already has. However, the industry, and job opportunities are very sensitive to changes in technology and construction. Increasing interest in silviculture could expand opportunities for qualified foresters.

Unemployment in 1987 was very low, suggesting that current labour market conditions for this occupational group are more favourable than for most occupations. In B.C., most of these workers are employed by the forestry and wood industries and the provincial government. Employment is usually full-time, although it fluctuates during the year, peaking during the warm months. In 1986 women were employed in 17% of these jobs.

Earnings

The average annual employment income in B.C. was approximately $25,400 in 1986. Fifty-seven percent were employed full-time, full-year, and these workers' earnings averaged $34,900.

In 1987, foresters in the federal public service earned from $17,354 to $31,264 (entrance level); $40,036 to $48,239 (middle level); and $52,806 to $60,237 (senior level).

Related Occupations

Agricultural Scientists, Biological Scientists and Farm Managers.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,010	1,130	1,250

Annual Growth 1987-1995: 1.3%

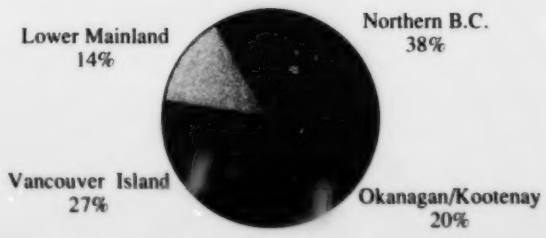
Main Industries of Employment 1986 Census

Forestry	72%
Provincial Government	10%
Wood Products	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
120	120	240

Employment by Region



Nature of the Work

Architects design buildings and other structures, integrating social, economic and environmental factors. They require design talent, engineering ability, social awareness, business aptitude and legal knowledge. Designing a building involves more than preparing carefully scaled drawings of a visually appealing structure. Buildings must be safe and meet strict adherence to the client's wishes, which often change throughout the planning process, and to building codes, zoning laws, fire regulations and other ordinances.

During the construction phase, architects visit the building site and work with builders, contractors and construction managers to ensure that the work meets the specified standards. Design work is often interrupted by meetings with clients, consultants, planning officials and building commissioners.

This group also includes landscape architects, who design parks and recreation areas, and naval architects, who design ships and off-shore installations.

Although men have dominated this occupation in the past, the participation of women has increased from 3% in 1971 to 9% in 1986. Employment is generally full-time.

Education and Skills

Education, experience and professional registration are required. UBC offers a three year Bachelor of Architecture degree. Prerequisites include a bachelor's degree in arts, social sciences, humanities or sciences; three years at an accredited School of Architecture; or a two year college Building Technology program plus three years university. Another option for those employed with a professional architect is the nine year correspondence program offered by the Royal Architectural Institute of Canada in Ottawa. All architects must be certified by the Canadian Architectural Certification Board. Most architects (77%) have an undergraduate university degree in architecture.

Architects should be able to work independently, but must also be prepared to work in a competitive business environment where leadership and ability to work with others are important. Flexibility and patience are needed when clients request changes after final plans are developed. Students who can gain summer work experience at architectural, engineering or contracting firms are at a definite advantage.

B.C. Job Prospects

From 1981 to 1986 the number of architects in B.C. declined, however the employment outlook to 1995 is for growth at about the all-occupation average. On an employment base of 1,300 in 1987, about 250 new jobs will be created, and an additional 240 openings should occur from attrition, by 1995.

The outlook is dependent on the business services industry, the government sector and the construction industry. The construction industry is expected to be strong in the short term, in both residential and non-residential. Both business services and construction are cyclical. New opportunities may be best with smaller companies because of the increasing trend of home renovation.

Virtually all architects in B.C. work in the business services sector, including both engineering and architectural firms. Thus architecture is highly vulnerable to economic conditions and some jobs may be lost during economic recession. Unemployment among architects is currently below the all-occupation average.

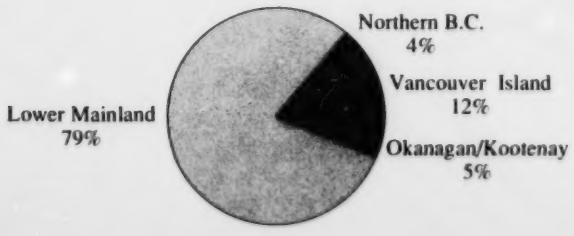
Technology, such as three-dimensional design software, has increased productivity, raised skill requirements and may displace some architects in the long term. Architects with computer-aided design (CAD) skills will have the competitive edge.

Earnings

In 1986, starting salaries in the federal government ranged from $20,000 to $31,700, and senior positions from $45,800 to $63,900. The average salary in B.C. according to the 1986 Census was $26,700, and $32,200 for those working full-time over the whole year.

In architectural/engineering firms and for independent consultants, fees for designing and supervising the construction of a building are based on its size, complexity and cost.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,330	1,310	1,550

Annual Growth 1987-1995: 2.2%

Main Industries of Employment 1986 Census

Architectural & Engineering Services 96%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
250	240	490

Nature of the Work

Chemical engineers work in many phases of the production of chemicals and chemical products. Like all engineers, they apply the theories of science to the economical solution of practical technical problems. Specialties include petrochemicals, pulp and paper, explosive, polymerization, environmental, or plastics engineering. Because the duties of chemical engineers also cut across many fields including synthetic textiles, foods and biotechnology, they may apply principles of chemistry, physics, mathematics, mechanical and electrical engineering.

In indoor or outdoor factories, chemical engineers work with machinery, chemicals, materials and equipment. Junior engineers spend more time in the field, moving into offices and laboratories as their responsibilities increase. Senior engineers may manage plants or major projects.

They work a 35-40 hour week but may work overtime to meet a deadline or deal with an emergency. Within 10-15 years many enter management positions. Nearly all chemical engineering jobs are full-time and non-seasonal but employment is linked to the business cycle.

Chemical engineers are generally university graduates in chemical or mechanical engineering and most are men. With virtually no women in the profession in 1971, there were 6% by 1981 and 10% by 1986. About 20% of new chemical engineering graduates are women.

Education and Skills

UBC offers a four year Bachelor of Science in Chemical Engineering. This is the suggested minimum requirement and practical experience is recommended. Postgraduate study is of increasing importance. In addition to meeting general UBC entry requirements, applicants must have Grade 12 Algebra, Physics, and Chemistry, with Geometry 12 and Enriched Algebra 12 highly recommended. A chemical and biochemical processing and biotechnology core program is to be phased into SFU's engineering science program. As competition for admission is extreme, some students first complete first year science at university or college to increase their qualifications.

The practice of engineering is limited to registered members of the Association of Professional Engineers of B.C. After graduation, at least two years of experience and professional practice are required for full membership.

Engineers should be able to work on a team and need to be creative, analytical, and detail oriented. They should also be able to express themselves well, both orally and in writing.

B.C. Job Prospects

Most chemical engineers in Canada work in either Ontario or Alberta with about 8% working in B.C. Here 30% work in the petroleum products manufacturing, 24% in engineering consulting, and 22% in pulp and paper and related manufacturing.

Employment was hit hard by the recession of the early to mid-1980s due to declines in manufacturing, the key industry for chemical engineers. Job prospects are now better and growth to 1995 is projected to be at about the all-occupation average, based on the outlook for the oil and pulp and paper industries. About 60 new chemical engineering jobs are expected to be created and 60 more openings are expected due to attrition. This would result in total employment of 430 by 1995. This is a small occupation and one of the smaller engineering specialties.

Current job opportunities are good and unemployment rates are below average. Some Canada Employment Centres have hard-to-fill vacancies for specialties in this area.

Earnings

In 1986, $28,000 was the Canadian average starting salary for bachelor's graduates and $29,400 for those with a master's degree. The average employment income for all those in B.C. in this occupation was $40,800 according to the 1986 Census, and $48,400 for those working full-time over the entire year.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	400	380	430

Annual Growth 1987-1995: 1.7%

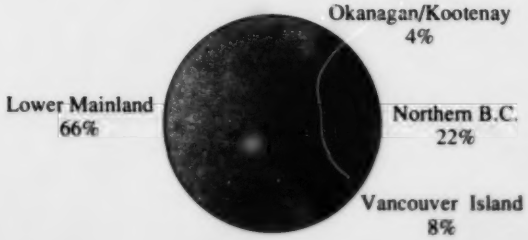
Main Industries of Employment 1986 Census

Petroleum Products Manufacturing	30%
Engineering Consulting	24%
Pulp & Paper & Related Manufacturing	22%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
60	60	120

Employment by Region



Nature of the Work

Civil engineers design, plan and supervise the construction of tunnels, highways, airports, bridges, environmental systems, irrigation and drainage systems, water systems, sewage systems and buildings. Major specialties are structural design, construction, transportation, roads, pollution control and municipal government. With ability and experience, civil engineers can move into many supervisory or administrative positions, such as city engineer or project designer.

Civil engineers work a 35-40 hour week, with some overtime for special projects or emergencies, and generally work full-time, over the whole year. They often leave the office to visit the work site.

Since employment is primarily in the construction and business services industries, economic recession can result in lost jobs. Men dominate this occupation but women have increased their participation in B.C. from 1% in 1971 to 4% in 1986.

Education and Skills

Most civil engineers have a university degree in civil or mechanical engineering. Graduation from UBC's four year Bachelor of Science in Civil Engineering is considered to be the minimum qualification, and practical experience is highly recommended. Environmental engineers require a four year Bachelor of Science in Bioresource Engineering available at UBC. SFU's School of Engineering Science is phasing in chemical and biochemical processing and biotechnology. Postgraduate study is increasingly important.

In addition to meeting general requirements, applicants must have Grade 12 Algebra, Physics, and Chemistry, with Geometry 12 and Enriched Algebra 12 highly recommended. As competition for admission is extreme, some students complete first year science at university or college to increase their qualifications.

The practice of engineering is limited to registered members of the Association of Professional Engineers of B.C. After graduation, at least two years of experience and professional practice are required for full membership.

Engineers should be able to work on a team, be creative, be analytical and detail oriented. Interpersonal skills and communication skills, written and oral, are important because civil engineers come into direct contact with clients, the public, colleagues, management and site workers.

B.C. Job Prospects

Within the province civil engineers are concentrated in engineering firms (42%), government (20%) and construction firms (11%). Employment grew quickly in the 1970s but declined during the recession of the early-mid 1980s. However, this occupation is still a large one in B.C. and is the largest engineering specialty.

Employment growth to 1995 is projected to be at the all-occupation average. This is based on the outlook for construction where almost all work is targeted. About 1,230 openings are expected, about 630 will be new jobs and 600 will be due to attrition.

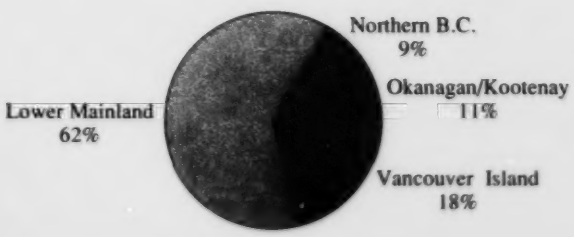
Population growth and the resulting demand for housing and transportation are an indication of good long-term prospects for employment growth. Developments in computer planning methods and other technologies are expected to limit this growth somewhat.

As with most of the engineering occupations, the unemployment rate for this group is low, indicating good labour market conditions.

Earnings

In 1986 the national average starting salary was $27,700 for bachelor's graduates and $29,400 for master's. In B.C. the average salary for this occupation was $36,800, according to the 1986 Census, and $43,100 for those working full-time over the whole year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,510	4,040	4,670

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Engineering Consulting	42%
Government	20%
Construction	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
630	600	1,230

Nature of the Work

Electrical engineers seek economical solutions to the design, construction and maintenance of electrical and electronic equipment. They specialize in the fields of electrical power or electronics. Electronic equipment includes telecommunications, control systems, computers, automated systems, robotics, avionics, software design and consumer goods such as TV sets and stereo components. Electrical equipment includes power generating and transmission equipment used by electric utility companies such as B.C. Hydro, as well as controls and wiring in buildings, cars and airplanes.

During the research, design and development of a project, electrical engineers discuss technical matters with management, confer with colleagues, direct projects and participate on multi-disciplinary teams. With experience many move into management.

They work 35-40 hours a week with some overtime for projects or emergencies. Jobs are usually full-time, year-round. The work place varies from office, plant to outdoors. Men dominate this occupation, but women increased their participation from 1% in 1971 to 4% in 1986.

Education and Skills

Graduation in an electrical or electronic engineering program is the minimum qualification, and practical experience is recommended. Postgraduate engineering study is increasingly important.

UBC has a four year Electrical Engineering Program with options in computers and honors mathematics. There is also a five year Engineering Physics Program with an electrical engineering option. SFU offers a four year Engineering Program with options in computing, mathematics, microelectronics, biomedical, physics, robotics and control, and manufacturing systems. UVic offers four year programs in Electrical Engineering and Computer Engineering. The electrical engineering program has options in communications, signal processing, microelectronics, VLSI systems, CAD/CAM, control systems, and robotics.

In addition to general requirements, applicants must have a strong high school background in science and mathematics. Since competition for admission is extreme, some students complete first year science to increase their qualifications. Community colleges all offer transfer credit courses towards university engineering programs. The practice of engineering is limited to registered members of the Association of Professional Engineers of B.C. After graduation, at least two years experience and professional practice are required for full membership.

Engineers should be able to work on a team and to be creative, analytical and detail oriented. They must also have good communications skills, both oral and written.

B.C. Job Prospects

The market for electronics engineers grew throughout the 1980s and is the best of the engineering disciplines. Growth to 1995 should greatly exceed the all-occupation average. The B.C. economy is expected to generate about 580 new jobs through to 1995, and a further 430 openings from departing personnel, for a total of 1,010 openings.

Employment is in business services (24%), telephone and telecommunications (20%), electric power industry (16%), and electrical and electronics manufacturing (12%). In Canada nearly 70% work in Ontario or Quebec, with the rest evenly distributed among the other provinces. B.C.'s growth in telecommunications, fiber optics, micro-processor technology and its applications have all increased the demand for electronics engineers. The market for electrical power engineers is not as strong as electronics, but is still better than average.

Earnings

In 1986, $27,732 was the average starting salary for graduates with bachelor's degrees and $29,352 for those with masters degrees. In 1984, $31,030 was the average salary for 1982 university graduates employed in this occupation.

The 1986 average salary across this profession in B.C. was $35,900, and $40,500 for those working full-time over the whole year.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,880	3,310	3,890

Annual Growth 1987-1995: 2.0%

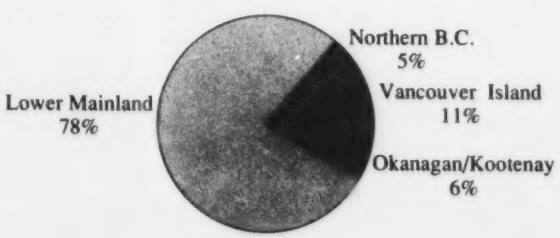
Main Industries of Employment 1986 Census

Engineering Consulting	24%
Telephone & Telecommunications	20%
Electric Power	16%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
580	430	1,010

Employment by Region



Industrial Engineers
Organization and Methods Analysts

2145
1173

Nature of the Work

Industrial engineers are concerned with the safe, efficient and economical integration of personnel, plant, machinery, equipment and materials. They analyze methods, quality control, and plant lay-out as well as doing time and motion studies and safety engineering. They work mainly indoors, often on the plant floor. In offices they are concerned with efficiency and systems.

Analysts review, analyze and improve systems so that organizations operate effectively. They design systems and procedures for work processes, work measurement and simplification, records management, and prepare operational manuals.

This group works a five day, 35-40 hour week, and employment is generally full-time, year-round. Unemployment, while about average, is high for engineers. Women have increased their numbers from 4% in 1971 to 14% in 1986.

Education and Skills

Most engineers have a bachelor's and some a master's degree in industrial engineering or equivalent. UBC offers graduate studies following the four year Bachelor's in Mechanical Engineering. UVic offers a manufacturing and business management option in its Bachelor of Mechanical Engineering. SFU's Bachelor's in Engineering Science offers industrial automation with manufacturing systems, robotics and control options.

Applicants must have strong high school science and mathematics, and admission is limited. Some complete first year science to increase their qualifications. Community colleges all offer transfer courses for engineering.

Analysts usually have a bachelor's degree in engineering, commerce or business administration and one to two years job experience. SFU's Bachelor of Business Administration offers a concentration in management science and information systems. Analysts may also be BCIT or community college graduates in engineering or business, with two to four years experience. BCIT's two year Operations Management Diploma stresses productivity improvement for management careers, including work-study analyst. Requirements include Grade 12 with Algebra 11, and Physics 11 preferred. All colleges offer business administration.

The practice of engineering is limited to registered members of the Association of Professional Engineers of B.C. After graduation, at least two years of experience and professional practice must be met for full membership.

Engineers and analysts should be able to work on a multidisciplinary team, be creative, analytical, and detail oriented. They need good communication and interpersonal skills to deal with management and direct others. In a manufacturing setting they must be familiar with all aspects of their industry.

B.C. Job Prospects

Employment growth is projected to be about average for both engineers and analysts and should create a total of 570 employment opportunities through to 1995. About half will be new jobs and half will be replacements for attrition. Together these occupations constitute an average size job group of about 1,700 and a good size engineering specialty.

Increasingly automated systems and CIM (Computer Integrated Manufacturing) require industry-applied computer systems and analysis knowledge, for both analysts and engineers. Employment growth will be constrained by computer technology.

Engineering jobs are concentrated in manufacturing (48%), engineering services (12%), and transportation (8%). Analysts work in business and engineering services (59%), government (10%) and the financial sector (9%). Jobs in most sectors are sensitive to business conditions.

Earnings

In 1986, the national average starting salary was $27,700 for those with bachelor's degrees in engineering and $29,400 for master's graduates. In B.C. the average salary for all engineers in this field was $36,400, according to the 1986 Census, and $39,800 if full-time over the whole year. Analysts averaged $29,400 and $37,700 if full-time, full-year.

Employment by Region

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,780	1,700	1,970

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Manufacturing	28%
Engineering Consulting	8%
Government	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
260	310	570

Nature of the Work

This group includes agricultural engineers, forest engineers, irrigation specialists, geological engineers and engineering physicists. Forest engineers plan timber cutting, loading and storage. They may review survey maps and air photos to advise and supervise the construction of roads and bridges. Geological engineers investigate land for geological formations that might yield oil or minerals. They analyze seismic and other data to advise production personnel on economical extraction methods.

Agricultural engineers seek economical solutions to problems in agriculture. For example, they may design sensing instruments to record the effects of humidity and light on plants and animals, or the effectiveness of different methods of applying insecticides. They also design machinery, test soils and crops, design irrigation and drainage systems, and design storage, processing and product distribution systems. Engineers work a five day, 35-40 hour, week and are frequently away from their desk in the field. Most jobs are full-time over the whole year.

Although these occupations are dominated by men, women's participation has increased steadily since 1971. Nearly 20% of agricultural engineers are women.

Education and Skills

Forest engineers usually complete the four to five year Bachelor of Applied Science in Forestry Engineering Program at the University of New Brunswick. UBC's Faculty of Forestry offers relevant master's degree programs. The Association of Professional Engineers of B.C. may require these graduates to complete engineering related courses and pass examinations to obtain full membership in the Association.

Geological engineers usually complete a four year Geological Engineering Degree at UBC. Options include minerals and fuels, applied geophysics and geotechnical. Engineering physicists complete the five year Bachelor in Engineering Physics Program. Options include electrical, mechanical, metallurgy, geophysics, computer science and oceanography. Graduation from UBC's four year Bachelor in Bioresource Engineering is the minimum qualification for agricultural engineers; practical experience is also highly recommended.

In addition to general UBC requirements, applicants must have Grade 12 Algebra, Physics, and Chemistry, with Geometry 12 and Enriched Algebra 12 recommended. Competition for admission to engineering is extreme and some students complete first year science at university or college to increase their qualifications. Postgraduate study is increasingly important.

The practice of engineering is limited to members of the Association of Professional Engineers of B.C. After graduation, a minimum of two years of experience and professional practice is required for full membership.

Engineers should be able to work on a team and be creative, analytical and detail oriented. They need good communication skills, both oral and written, as well as good interpersonal skills to deal with senior management, colleagues and the public.

B.C. Job Prospects

Employment for this small group grew much higher than average from 1981 to 1987, with annual growth through to 1995 slowing to average. A total of 410 job openings will occur, of which about two thirds will be due to attrition.

Industrial distribution varies according to specialty but overall most are employed in engineering and technical services (54%). Otherwise, agricultural engineers work mainly in government, forest engineers in forestry and geological engineers in mining.

Earnings

According to the 1986 Census, the average employment income for all agricultural engineers in B.C. was $24,800, and $41,700 for those that worked full-time over the whole year. Forest and other engineers averaged $33,700, and $39,300 for full-time, whole year workers.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	870	1,070	1,250

Annual Growth 1987-1995: 1.9%

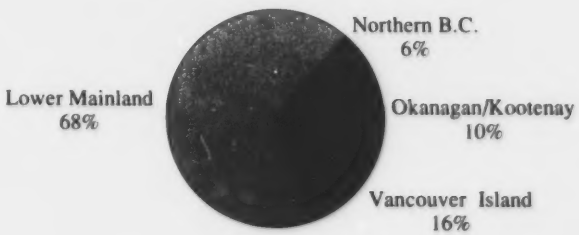
Main Industries of Employment 1986 Census

Engineering Services	54%
Forestry	14%
Government	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
170	240	410

Employment by Region



Nature of the Work

Mechanical engineers design, develop and maintain power using and producing machines. Power producing machines include internal combustion engines, jet engines and rockets. Power using machines include refrigeration, air-conditioning and industrial production equipment. There are many factors that engineers must consider in the process of developing a new product. In the case of an industrial robot, engineers must first determine the way the robot is expected to work, then design and test all components and finally fit them together in an integrated plan. They also must evaluate its overall reliability, safety and cost.

Specializations are in automotive engineering, plant and machine design, heating systems design, refrigeration, heat transfer/thermodynamics and hydraulics. They may work with other specialists where appropriate, such as computer engineers to develop robots. With experience, they may direct others, advise management, consult with colleagues and deal with outside agencies, customers or suppliers.

Engineers work in the office and at the plant, close to machinery and equipment. Employment is generally full-time, year-round with a 35-40 hour, five day week. Most mechanical engineers are men, but women have had an increased presence since 1971 and about 6% of graduates are now women.

Education and Skills

Graduation from UBC's Bachelor of Science, or UVic's Bachelor of Engineering in mechanical engineering, is the minimum requirement. These are four year programs. UBC's options are in naval architecture and computer-aided automation. UVic's options are in design and computer-aided engineering, manufacture and business management, and ocean engineering. Applicants must have a strong background in science and mathematics, and are advised that admission to engineering is limited. Since competition for admission is extreme, some students complete a first year science program to increase their qualifications. All community colleges offer transfer credit courses towards the university engineering programs.

The practice of engineering is limited to registered members of the Association of Professional Engineers of B.C. After graduation, at least two years of experience and professional practice are required for full membership.

Mechanical engineers need good interpersonal skills as well as a broad knowledge of their industry, including marketing and sales. They should be able to work on a team and be creative, analytical, and detail oriented. They also need good communications skills, both oral and written.

B.C. Job Prospects

The B.C. economy will create about 320 new mechanical engineering jobs to 1995. Another 320 openings are projected due to attrition, for a total of 640 openings. This projected increase is consistent with average employment growth. It reflects general and broad based economic growth for B.C.

While the employment market for mechanical engineers should be in balance to 1995, some specialties are in shortage. Unemployment in this occupation, as with most engineering occupations, is low.

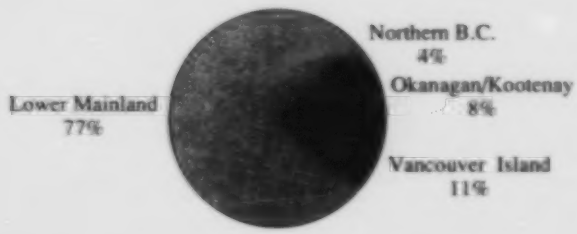
Mechanical engineers are found throughout almost all industries with some concentration in manufacturing (36%) and engineering services (34%). Their diversity in specialization and industry makes mechanical engineers less susceptible to economic recession, although some specialties depend on a few key industries.

Earnings

Nationally in 1986, $27,700 was the average starting salary for graduates in engineering and $29,400 for those with a master's degree.

According to the 1986 Census, the average salary for all mechanical engineers in B.C. was $35,500 and $41,400 for those working full-time over the whole year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,950	2,000	2,320

Annual Growth 1987-1995: 1.9%

Main Industries of Employment 1986 Census

Manufacturing	36%
Engineering Consulting	34%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
320	320	640

Nature of the work

Metallurgical engineers remove metals such as iron, copper, nickel and aluminum from ore, and then refine and alloy them to obtain metals which are tailored to meet specific requirements, such as heat resistance, strong but lightweight, or highly malleable. In doing so, they recover samples for laboratory analysis; devise methods of producing commercial quantities; charge mixtures and other variables in blast-furnaces and advise operation personnel on electrical current and temperature adjustments. Typical items produced include beams, pipes or plates.

Specialists within this group include extractive metallurgists, materials engineers, smelting engineers and process metallurgists. The work is technical requiring research, designing and computing skills. Work is divided between a desk, meetings and the actual work site. Managerial responsibilities generally increase with experience.

Most are employed full-time, year-round, but employment is linked to the economic outlook for primary metal manufacturing and mining, the two key sectors of employment.

While most engineers are men, since 1971 women's participation has increased. The Canadian Council of Professional Engineers estimates that 12% of graduates are women.

Education and Skills

Graduation from UBC's four year Bachelor of Science in Metals and Materials Engineering, or the five year Engineering Physics Program, is considered the basic qualification. The Metals and Materials Engineering Program has options in materials processing and materials science and engineering. The Engineering Physics Program has a metallurgy option. In addition to general UBC requirements, applicants must have Grade 12 Algebra, Physics, and Chemistry, with Geometry 12 and Enriched Algebra 12 recommended. As competition for admission to engineering is extreme, some students complete first year science at university or college to increase their qualifications. Postgraduate study is becoming increasingly important.

The practice of engineering is limited to registered members of the Association of Professional Engineers of B.C. After graduation, a minimum of two years experience and professional practice are required for full membership. Engineers should be able to work on a team, be creative, be analytical and detail oriented. They also need good communication skills, both oral and written.

B.C. Job Prospects

Over 80% of Canadian metallurgical engineers work in Ontario or Quebec with 7% in B.C. Although very small in number in B.C., this occupation is an important one in the provincial economy. The metal processing industry employs 70% of this occupation provincially, with the rest in engineering services (20%) and mining (15%).

Employment grew very fast during the 1970s and 1980s but is projected to slow to average growth through to 1995. Over the next eight years, about 20 new jobs will be generated, and 50 additional hirings will occur to replace departing workers, for a total of 70 jobs.

Employment prospects are dependent on the economic outlook for mining and metal manufacturing and is very sensitive to changes in economic activity and metal prices. Unemployment rates are currently low for metallurgical engineers, and Canada Employment Centres report a few hard-to-fill vacancies.

Earnings

In 1986, $27,700 was the average salary for engineering graduates and $29,400 for master's graduates in Canada.

In B.C. the 1986 Census indicated that the average income for everyone in this occupation was $37,400, and $45,500 was the average for those working full-time over the whole year.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	130	170	190

Annual Growth 1987-1995: 1.8%

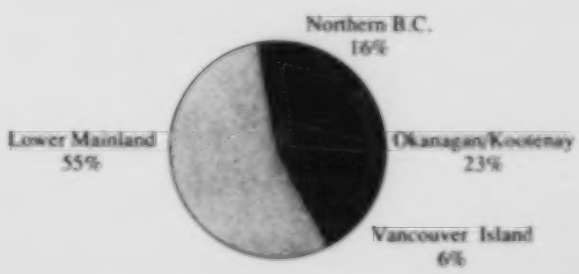
Main Industries of Employment 1986 Census

Metal Processing	70%
Engineering Consulting	20%
Mining	15%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
20	50	70

Employment by Region



▶ Mining Engineers 2153

Nature of the Work

This occupation includes design engineers, exploration engineers, production engineers, mineral engineers and safety engineers. They survey mineral deposits and ore bodies to determine commercial viability, decide on mining methods, plan and design mining facilities, oversee the construction of mine shafts and choose extraction processes. Efficiency, economy and safety are considered. Specialties of growing importance in this field are rock mechanics and mine planning.

Mining engineers work mainly in offices, but can also be found outdoors or in a mine shaft. Most job opportunities are in small communities close to where the mines are, but the jobs in urban centres tend to be the most sought after.

Employment is usually full-time and stable year-round, although activity in the mining industry can be affected by business conditions which reflect metal prices and demand for material. Managerial responsibilities increase with experience.

Most mining engineers are men but the number of women has been increasing since the 1970s. Individuals enter the occupation between 25-29 years, and a large portion move into management positions annually.

Education and Skills

Most new entrants have a university degree in an engineering area, such as civil, mechanical or chemical engineering, or in geology. Graduation from UBC's four year Bachelor of Applied Science Mining and Mineral Process Engineering is the recommended qualification. In addition to general UBC requirements, applicants need Grade 12 Algebra, Physics, and Chemistry, with Geometry 12 and Enriched Algebra 12 recommended. As competition for admission is extreme, some students complete first year science at university or college to increase their qualifications. Postgraduate study is increasingly important.

UBC also offers a four year Bachelor of Science in Geology. Grade 12 graduation with Chemistry 11, Algebra 12, Physics 11, and a science 12 is required for admission. Master's and doctoral programs are available.

The practice of engineering is limited to registered members of the Association of Professional Engineers of B.C. After graduation, at least two years of experience and professional practice are required for full membership.

Engineers should be able to work as part of a team, be creative, analytical and detail oriented. They also require good communications skills, both oral and written.

B.C. Job Prospects

Employment grew during the 1970s, but fell during the early to mid-1980s with the recession and depressed world metal prices. The expansion in gold mining operations in B.C. has offset this decline somewhat. Employment prospects to 1995 are good with growth slightly ahead of the all-occupational average. The outlook is dependent on the mining industry and an increase in metal prices would improve employment prospects. Over the outlook period most job vacancies will be from attrition. About 160 replacement openings and 130 new jobs are expected for a total of 290 openings by 1995.

Nearly 20% of Canadian mining engineers, or about 635, work in B.C.. Employment of engineers in the province is concentrated in the mining industry (65%) and engineering and scientific services (28%).

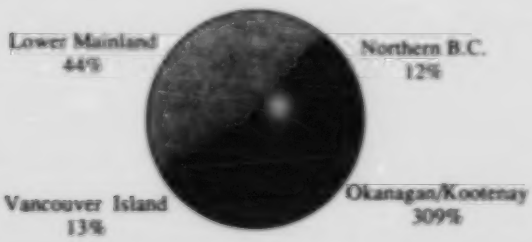
With the increasing application of technology to engineering and to the mining industry, good mathematics and computer skills are needed by those in this field.

Earnings

In Canada, starting salaries averaged $27,700 in 1986 for graduates in engineering and $29,400 for master's graduates.

According to the 1986 Census, the average employment income in B.C. for this occupation was $38,800, and $47,200 for those working full-time over the whole year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	710	640	770

Annual Growth 1987-1995: 2.4%

Main Industries of Employment 1986 Census

Mining	65%
Engineering & Scientific Consulting	28%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
130	160	290

Nature of the Work

Petroleum engineers locate reservoirs of oil and gas and determine the quantity and quality of reserves as well as economical recovery strategies. They may work in all areas of the petroleum industry, including exploration, recovery, refining and distribution. Specialties include drilling, reservoir, oil production and pipeline engineering. The work is technical and scientific, and includes cost estimates, design work, scheduling and supervision.

Most time is spent at the drill-site or processing plant, possibly in isolated areas. With experience they work more in an office in an urban centre. About 10% per year move into management positions.

Over 80% of Canadian petroleum engineers work in Alberta while about 3%, or 120, work in B.C. Most petroleum engineers are men but the number of women has grown to about 8% of the total employed provincially.

Education and Skills

Most new entrants are graduates in engineering, usually chemical or mechanical. UBC offers a four year Bachelor of Applied Science in Geological Engineering with options in minerals and fuels, and applied geophysics. Students in the minerals and fuels option can focus on hydrocarbon exploration and production; students in fuels and applied geophysics focus on geophysics in mineral or petroleum exploration. In addition to general UBC requirements, applicants must have Grade 12 Algebra, Physics, and Chemistry, with Geometry 12 and Enriched Algebra 12 recommended. As competition is extreme, some students complete first year science at university or college to increase their qualifications. Postgraduate study is increasingly important.

The practice of engineering is limited to registered members of the Association of Professional Engineers of B.C. After graduation, at least two years of experience and professional practice are required for full membership. Engineers should be able to work on a team, be creative, analytical and detail oriented. They require good communication skills, oral and written, since they often confer with senior management, engineering colleagues and the public.

B.C. Job Prospects

During the energy crisis of the 1970s, employment growth in this occupation was explosive. The recession and high interest rates of the early to mid-1980s, combined with lower oil prices, resulted in reduced total employment from 1981 to 1987. Slightly higher than average growth is expected to 1995. About 20 new jobs will be created and another 20 openings due to attrition for a total of 40 jobs are expected. This will continue to be a very small occupation in B.C. and one of the smallest engineering specializations.

About 36% of engineers work in the field of crude petroleum and natural gas exploration & extraction, 23% in engineering and scientific services industry, and 18% in petroleum products manufacturing and petrochemicals.

Jobs may be full-time, full-year, or concentrated in spells of development activity. For example, in 1986 only 43% of B.C. petroleum engineers worked full-time for the whole year. Employment is linked to the business climate of the oil and gas industry which in turn is linked to the international oil prices.

This occupation tends to be very mobile and people generally move to where the jobs are, whether in Canada or abroad. Despite the current slack in the oil industry, unemployment among petroleum engineers in B.C. is low.

Earnings

In 1986, $27,700 was the national average starting salary for bachelor's graduates and $29,400 for master's graduates.

According to the 1986 Census, the average employment income for this occupation in B.C. was $30,500 and $37,000 for the 43% working full-time over the whole year.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	150	120	140

Annual Growth 1987-1995: 2.3%

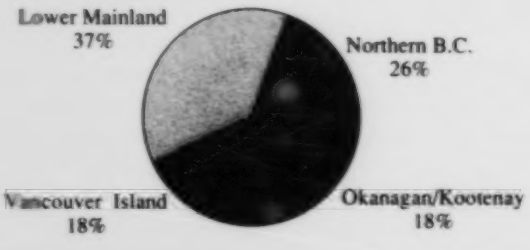
Main Industries of Employment 1986 Census

Oil & Gas Exploration & Extraction	36%
Engineering & Scientific Consulting	23%
Petroleum & Petrochemical Manufacturing	18%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
20	20	40

Employment by Region



Nature of the Work

Aerospace engineers research, design, produce and test aircraft, missiles and spacecraft. While this is a small specialized area, they may further specialize in structural design, navigational control, guidance systems, instrumentation, flight analysis or stress analysis and testing. They may also specialize according to the type of product, for example, passenger planes, military aircraft, satellites, or helicopters.

They work at design stations (mostly computerized), research and testing laboratories, and on the production floor. A few may work at launch sites or sometimes even in flight. Inexperienced aerospace engineers are given technical research or design assignments. As their careers advance, they may direct others or an entire facility.

The number of women has increased since 1971 but men still account for most aerospace engineers. Most jobs are in Ontario or Quebec (75%), with about 210 or 8% in B.C.

Education and Skills

Most aerospace engineers have a mechanical engineering degree. Completion of a recognized four to five year bachelor's degree in this area or in electrical engineering or engineering physics is usually required. UBC offers a four year Bachelor of Applied Science in Electrical Engineering or Mechanical Engineering and a five year Engineering Physics Program. SFU's School of Engineering Science offers a four year program with options in electronics, computer, manufacturing systems, robotics and control engineering and engineering physics. UVic has four year programs in Electrical and Mechanical Engineering. Study at the postgraduate level is increasingly important. Outside B.C., an Aerospace Engineering Program is offered at the University of Toronto's Institute of Aerospace Studies.

In addition to meeting the general requirements of the universities, applicants must have a strong high school background in science and mathematics. Admission to all the programs is limited and based on previous academic performance. Some students complete a first year science program to increase their qualifications. B.C.'s community colleges all offer transfer credit courses towards these engineering programs.

The practice of engineering is limited to registered members of the Association of Professional Engineers of B.C. After graduation, at least two years of experience and professional practice are required for full membership. Engineers should be able to work on a team, be creative, analytical and detail oriented. Contact with senior management, other engineers and co-workers requires strong interpersonal as well as strong communication skills, oral and written.

B.C. Job Prospects

Employment fluctuates due to the boom and bust cycles characteristic of the aerospace industry. Current unemployment rates for aerospace engineers are below average, and employment growth is expected to be about average to 1995. About 400 new jobs across Canada are expected to 1995, 20 of which will be in B.C. Departing personnel will create an additional 20 openings in B.C. and 1,000 across Canada. This will continue to be a small occupation in B.C. and one of the smallest engineering specializations.

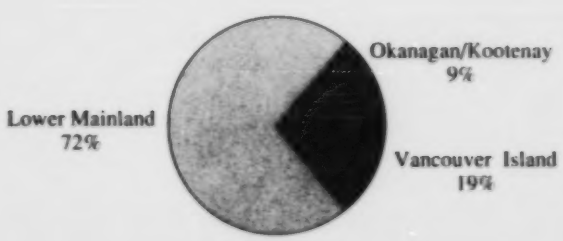
Most jobs are full-time, full-year but employment is affected by the business cycle and the state of the aerospace industry. Employment is concentrated in the air transportation industry (76%), aircraft and parts manufacturing (10%), and engineering consulting firms (10%).

Earnings

Nationaly in 1986 $27,732 was the average starting salary for engineering graduates with a bachelor's degree and $29,352 for those with a master's degree.

According to the 1986 Census, the average employment income for this occupation in B.C. was $33,700 and $34,600 for those working full-time over the whole year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	210	210	230

Annual Growth 1987-1995: 1.2%

Main Industries of Employment 1986 Census

Air Transportation	76%
Aircraft & Parts Manufacturing	10%
Engineering Consulting	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
20	20	40

Nature of the Work

Community planners are often called urban or regional planners. They plan services, facilities and the use of residential, commercial, industrial and recreational land in urban, suburban and rural settings. They help officials make decisions on social, economic, and environmental problems.

Planners spend most of their time in offices. To be familiar with areas that they are developing, however, they occasionally spend time outdoors examining the features of the land under consideration for development, its current use, and the types of structures existing on it. Most work a five day, 35-40 hour week, but sometimes must attend evening or weekend meetings or public hearings with citizens' groups.

Planners often confer with land developers, civic leaders, and other public planning officials. They may prepare materials for community relations programs, speak at civic meetings, and appear before legislative committees to explain their proposals.

Women are increasing their participation in this occupation and they now constitute nearly one quarter. Most jobs are full-time, year-round but contract work is increasing.

Education and Skills

Employment in this occupation usually requires a master's degree. UBC offers a two year Master's Degree Program in Community and Regional Planning with specializations in urban and regional planning, urban physical planning, urban policy planning and regional and natural resources planning.

UBC also offers a two year part-time certificate program in Site Planning which focuses on the residential environment and the Faculty of Commerce offers a four year extramural diploma program in Urban Land Economics. SFU offers a Master of Resource Management Program and BCIT has a one year post-diploma program in Natural Resources Management.

After a minimum of two years of acceptable planning work, a degree holder may apply for membership in the Canadian Institute of Planners. Planners must be able to think in terms of spatial relationships and visualize the effects of their plans and designs. They also must be able to work as part of a team and have the ability to write clearly and effectively.

B.C. Job Prospects

Nearly 40% of planners work in government and most of these work at the municipal level. About the same proportion, 37%, work in business and engineering services. The outlook for this occupation to 1995 is therefore heavily tied to municipal spending, which is expected to grow only slowly, and to the prospects of the construction industry, where moderate growth is expected.

While employment grew at a better than average rate from 1981 to 1987, growth at the all-occupation average is projected to 1995. A total of 300 opportunities will be created over this period. Slightly more will occur through attrition of those currently in this occupation than from new job growth. This will continue to be a medium size occupation in B.C., employing almost 1,200 by the end of 1995.

Increasingly work is undertaken on contracts as opposed to permanent employment, where workers are employed on project teams by business and engineering consulting firms.

Because of the tie to the construction industry, jobs may be affected by economic downturns.

Earnings

According to the 1986 Census the average employment income of all planners in B.C. was $30,400, and $37,000 for those planners working full-time over the whole year.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	950	1,050	1,190

Annual Growth 1987-1995: 1.6%

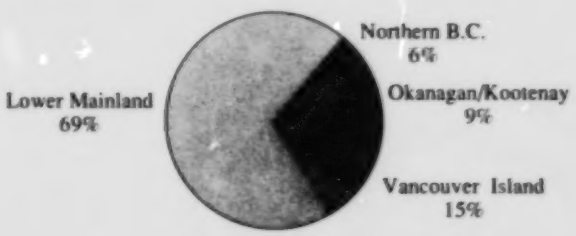
Main Industries of Employment 1986 Census

Consulting Services	37%
Municipal Government	28%
Other Government	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
140	160	300

Employment by Region



Nature of the Work

Included in this group are land, marine, pipe-line, port, topographic and hydrographic surveyors as well as instrument persons. They determine boundaries, locations, elevations, contours and waters for maps, construction, mining and other purposes, by taking measurements with such instruments as accelerometers, gyroscopes, transits and levels.

Surveying has been revolutionized by technology. Computers now refine measurements taken in the field, draft maps, and assist environmental planning and analyses. Electronic distance measuring devices and even navigation satellites accurately study the earth for geodetic surveying. Computer-aided design (CAD) systems integrate information, including aerial photographs, with electronically stored maps.

While surveyors usually work out of an office, measurements are taken outdoors at the survey site, which may be any where from a residential subdivision, construction site, a rural road under construction, on a boat, or in a mine. Surveyors need an interest in mathematics, computers and earth sciences and a vigorous outdoor lifestyle.

Most jobs are in engineering and surveying services (33%), construction (23%) and government (17%). Women have increased in number significantly since 1971.

Education and Skills

Most surveyors graduate from a university survey program but many have degrees in civil engineering or geodesy. To obtain a degree in surveying, students may take two years of civil engineering at UBC and complete the two final years in surveying engineering at the University of Calgary.

University engineering applicants must have Grade 12 Algebra, Physics, and Chemistry, with Geometry 12 and Enriched Algebra 12 recommended. As admission is limited, some students complete first year science to increase their qualifications. There are also engineering transfer programs at some community colleges and SFU.

BCIT offers one and two year surveying and mapping technology programs. Those with interests in photography, computers and cartography should consider the photogrammetric operators program. Two year surveying program graduates meet academic requirements for registration with the Applied Science Technologists and Technicians of B.C. and receive some transfer credit at the University of Calgary mentioned above. Grade 12 is required, including Algebra 12 and Physics 11.

The designation, Provincial Land Surveyor, requires registration with the Corporation of Land Surveyors of B.C. Their work involves legal boundaries and related statutes. This designation requires up to 45 months of articling under a Registered Land Surveyor and passing an examination. Registration as a Professional Surveying Engineer and a Canada Lands Surveyor is possible with appropriate practical experience.

B.C. Job Prospects

The employment growth to 1995 is projected to be average, based on the outlook for the construction industry. A total of 380 new jobs should be created by the economy with an additional 230 openings due to attrition, for a total of 610 openings.

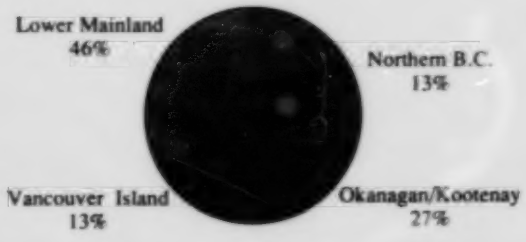
Aerial surveyors are particularly affected by technological developments. The demand for other specialized areas may be affected by the development of further sophisticated equipment.

Employment is linked to economic conditions. While there is below average levels of part-time work, less than 50% of surveyors work full-time for the whole year. Because construction and related activities peaks during the mild months, employment follows this seasonal pattern.

Earnings

In 1986, the average employment income in B.C. for this occupation was $24,300, and $32,000 for those working full-time over the whole year. Salaries in the lower mainland in 1989 range from $30,000 to $42,000. Partners in surveying or engineering firms may make considerably more.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,470	2,110	2,490

Annual Growth 1987-1995: 2.1%

Main Industries of Employment 1986 Census

Surveying & Engineering Services	33%
Construction	23%
Government	17%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
380	230	610

Nature of the Work

This occupation is changing rapidly. Originally draughtspersons were trained in technical drawing to develop working drawings (blueprints) or plans from sketches prepared by designers, engineers or architects. Some of this work is still undertaken but increasingly draughtspersons now use computer programs (CAD) which undertake much of the basic and repetitive drawing work. This frees draughtspersons to undertake more technical work or specialized work. Typically specialties may be aeronautical, architectural, electronics, mechanical or marine engineering draughting.

In addition, CAD (computer assisted draughting) and CADD (computer assisted draughting and design) programs allows engineers, designers or technicians to prepare some of their own technical drawings while CAM (computer assisted manufacturing) can mean that engineering drawings are sent by computer from design point to production point without preparing drawings.

Women are now more involved and comprise 20% of total employment.

Educational and Skills

There are several different educational routes for entering this occupation from university through college courses to apprenticeship. CAD and CADD/AutoCADD are an industry reality and these programs offer the most technologically up-to-date training. The two year Draughting/CAD Technology program requires Grade 12 with Algebra 12 and Physics 11. The 240 hour programs in CADD/AutoCADD are designed for experienced draughtspersons or graduates of a draughting program.

BCIT offers a two year diploma in Draughting CAD/CAM Technology and one year post-diploma programs in A/C Spatial Information Systems Technology, Advanced Manufacturing Technology and Resource Processing Technology. Most community colleges and BCIT also offer entry-level draughting programs which last eight to twelve months. Grade 12, with Math 11 are the minimum for entry and there are four year apprenticeships in architectural, hull and mechanical draughting that can follow these programs. In addition to college programs, UBC, SFU and UVic all include CAD/CAM in certain engineering programs.

Three-dimensional visualization ability as well as strong mathematical skills are needed.

B.C. Job Prospects

The projections based on recovery in construction, manufacturing and business services suggest that this occupation will grow at about the all-occupation average. This would allow for 660 new jobs and 460 openings due to attrition in a fairly large occupational group. Total employment is expected to be 4,450 by 1995 and will still be lower than the 1981 total. It should also be noted that the projections do not adequately encompass all the technological changes taking place which is reducing the need for draughtspersons for repetitive and basic work.

Draughtspersons are employed throughout most industries with concentrations in engineering business services (43%), manufacturing (16%) and forestry (5%). Employment is project oriented and is sensitive to economic downturns.

Earnings

In 1986 the average employment income for all people in this occupation was $24,300 while those that worked full-time for the whole year had an average salary of $32,000.

Annual starting salaries range from $17,700 to $21,400. Experienced draughtspersons in a supervisory capacity may receive as much as $58,000.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,410	3,780	4,450

Annual Growth 1987-1995: 2.0%

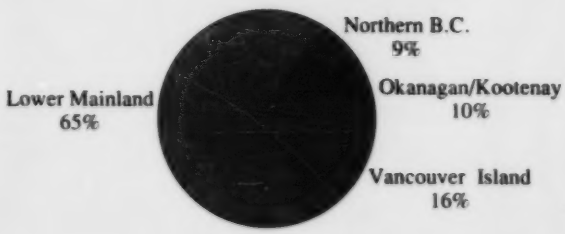
Main Industries of Employment 1986 Census

Engineering & Architectural Services	43%
Manufacturing	16%
Forestry	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
660	460	1,120

Employment by Region



Engineering Technologists and Technicians 2165
Architectural Technologists & Technicians 2164

Nature of the Job

Technologists and technicians who are included in this field often work with engineers and scientists on development of new products or in setting up and monitoring industrial production systems. Fields of work match the array of fields that engineers are found in. In B.C. electrical and electronic engineering, mechanical engineering, robotics, chemical engineering, mining and civil engineering are typical fields. This group covers a very wide spectrum. Some technicians work in a high technology development team and some apply their knowledge in manufacturing as production or systems operators dealing with installation, testing and quality control. Technicians may work on medical equipment or on construction projects. Architectural technicians are another very small occupation within this wide group.

People who work in this field need to use theoretical knowledge in a practical way. They develop blueprints, use computers and they may make prototypes. Problem-solving skills are very important, as are communication skills because of the need to pass on information. The difference between technologists and technicians is that the former usually handles more complex work and has more experience.

The proportion of women in this wide field has increased considerably from 1% in 1971 to 11% in 1986.

Education and Skills

One and two year engineering technology programs offered at BCIT and the community colleges include the following fields: Applied Chemistry and Chemical Sciences; Scientific Computing Applications (SCAT); Computer Aided Design(CAD)/Computer Assisted Manufacturing (CAM); Electrical and Electronics; Automation and Robotics; Construction Engineering; Civil/Structural Engineering; Manufacturing Engineering; Mechanical Engineering/Systems; Mining, Petroleum and Plastics; Surveying and Mapping and Draughting Technology/CAD. Architectural specialties are looked after by BCIT's two year Building/Construction Technology Program and there is also an economics major aimed at construction and project management. All these require Grade 12, with English 12, Algebra 12 and Physics 11. The Architectural Institute of B.C. offers BCIT graduates credit for some examinations in their syllabus of studies.

For university graduates or experienced technologists, BCIT also offers one year advanced programs in computer modeling and mapping; advanced manufacturing; resource processing and natural resource management. Graduate technologists and technicians with two years experience are eligible for membership in the Association of Applied Science Technologists and Technicians of B.C.

B.C. Job Prospects

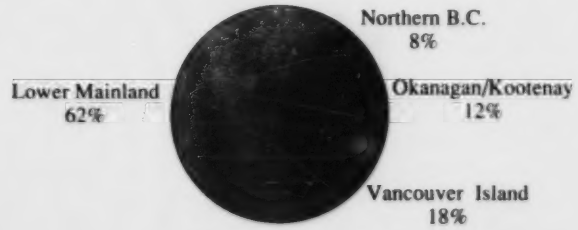
Employment declined sharply during the recession in the early to mid-1980s but unemployment is now about average. The outlook to 1995 calls for average employment growth. This means that this occupational group would employ about 4,300 in 1995 and that a total of 920 job opportunities, including growth and attrition, will be created during this period. Other openings are expected as workers from this job group move into supervisory positions. Employment prospects are vulnerable to economic downturns because of a dependence on construction and business services. Employment also depends on technology, a double-edged sword for these occupations. Innovations such as CAD (computer-aided design) enhance productivity and efficiency, but also limit employment growth. However, most long-term forecasters emphasize that technological skills will become increasingly important.

Predominant industries of employment for technicians are manufacturing (24%), government (16%) and business services (13%).

Earnings

According to the 1986 Census, the average employment income in B.C. was $26,200 across the engineering technologists/technicians field, and $31,400 for those 66% who worked full-time, full-year. Architectural technologists/technicians averaged $19,500, and the 26% who worked full-time, full-year averaged $33,500.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,520	3,730	4,300

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Manufacturing	24%
Government	16%
Engineering Services	13%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
570	350	920

Nature of the Work

This group includes systems analysts, software systems analysts, programmers and methods analysts. Typically they work in an office with computerized operations designing and/or implementing computer systems and procedures. Senior analysts may lead working groups and may move into management positions.

Systems analysts apply a methodical approach to solving problems using computers. They define problems in terms that will make it possible for programmers to write and test programs. Most of these problems in business relate to some form of record keeping, for example, inventory control or accounting.

The distinction between systems analysts, software systems analysts and programmers is blurring and the combination programmer/analyst is increasingly emphasized. Management skills as well as a knowledge of company organization and objectives are also often required.

Work is generally full-time, year-round, although part-time work has increased. Women make up almost one third of these professionals.

Education and Skills

Grade 12, with strong math and physics, followed by a two year community college program in computer systems management, or a four year university program in computing science is the minimum education requirement. Many now combine a bachelor's degree in computer science with another subject such as mathematics, physics or commerce. Computer systems management programs are available at all colleges, and many have transfer credit in computer science at UBC, SFU and UVic. Computer related engineering programs are also available at the three public universities.

Logical thinking and the capacity for exacting analytical work are required. In addition to managerial skills, systems analysts must have good communication skills. Ingenuity and imagination are crucial when programmers must find new ways to solve a problem. Continuing education is important because of constant changes in computer capabilities.

No formal licensing of programmers or systems analysts exists, although the Certificate of Data Processing (CDP) is increasingly recognized.

B.C. Job Prospects

Employment grew at a very high rate from 1981 to 1987 (over 7%) creating nearly 2,600 jobs. This is now considered to be a large job group. Employment growth to 1995 is projected at a rate in line with the all-occupation average for a total of about 1,550 job openings. However, continued technological change suggests that higher growth is probable to 1995 and that this estimate should be considered to be very conservative.

The information explosion has created new openings for database managers, systems engineers, software engineers, programmers and other information scientists. Increasing use of computer systems technology across all industries is likely to result in more jobs than forecast because this technology has generally favored employment growth for programmers and systems analysts. Unemployment in this occupational group continues to be very low.

With programmers and systems analysts becoming an integral part of business, the range of industry opportunities has expanded. Employment is now dispersed across all industries, with some concentration in business services (37%), manufacturing (10%) and government (9%). The forestry, construction and telephone/telecommunications sectors each employ about 5% of those in these occupations.

Earnings

In 1986, salaries in Canada averaged $20,000-$40,000 for programmer/analysts with one to two years experience and with five years experience ranged from $30,000-$57,000. Senior analysts and project leaders with two to five years experience received from $30,000-$43,000; those with seven or more years experience received from $38,000-$54,000.

According to the 1986 Census, the average employment income in B.C. for these occupations was $26,500 and $33,300 for full-time, full-year workers.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,760	7,320	8,380

Annual Growth 1987-1995: 1.7%

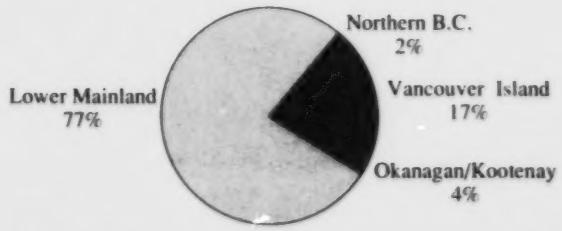
Main Industries of Employment 1986 Census

Business Consulting	37%
Manufacturing	10%
Government	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,060	490	1,550

Employment by Region



23

Occupations in Social Sciences and Related Fields

▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼

Nature of the Work

Economists study how people, firms and governments obtain money and how their spending influences the production and distribution of goods and services. While some are theoreticians, for example in universities, most are concerned with an applied area such as forestry, housing, energy, health or labour. Work varies considerably according to the employer but generally includes research, analysis and preparation of estimates, forecasts and reports.

Business economists advise companies and government agencies on operating efficiency, markets and marketing methods, and fiscal policy. Bank economists analyze business trends and develop forecasts on money and foreign exchange markets. Investment economists forecast the effects on capital markets of social, financial and political developments.

Economists are generally employed in central offices of government, corporate head offices, or in business consulting firms. They work 35-40 hours a week, Monday to Friday, and few work part-time. They may work alone or as part of a research team, may work under the pressure of deadlines and sometimes work overtime. Experienced economists may advance into management.

In B.C. most economists are employed in Vancouver and Victoria. Women have steadily increased their presence in the profession; they comprised 10% of economists in 1971, and 22% in 1986.

Technological change has enhanced the work of this profession as better computer systems and software perform calculations and store and manipulate large amounts of data. Economists now are able to spend more time analyzing data and preparing and writing reports.

Education and Skills

The minimum requirement for employment is a bachelor's degree in economics, statistics, commerce, or business administration. In general a master's degree with specialization in economics or business is required for new entrants into this field and a M.A. or Ph.D. is required for management or academic positions. All B.C. public universities offer undergraduate and graduate degrees in economics to the doctoral level. Most community colleges offer university transfer courses in economics up to the second year.

Although they must work well with others, economists must also be able to spend long hours on independent study and problem solving. They must be able to work accurately with detail and to express themselves effectively both orally and in writing.

B.C. Job Prospects

This is a small occupational group in B.C. and employment declined from 1981 to 1986. The outlook to 1995 is for employment growth at about the average for all occupations. A total of 300 employment opportunities should arise over this time with approximately the same number due to attrition as due to new job creation.

Economists are mainly employed in business and consulting services (30%), in government (21%), and finance, insurance and real estate (12%). Public administration opportunities are likely to be limited because of government fiscal restraint. The business services sector may be a better source of growth as governments increase their use of consultants rather than hiring permanent employees.

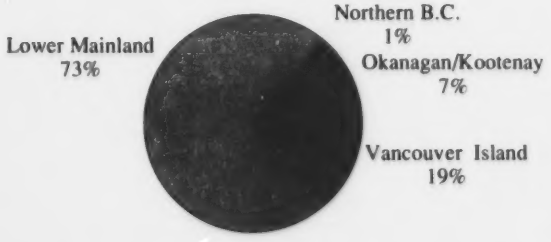
Those with good mathematical, quantitative and computer skills will have a competitive edge. Employment is generally fairly stable but is related to the business cycle and some jobs may be lost during an economic downturn. Unemployment is about average.

Earnings

Entry-level salaries for federal government economists range from $17,000 to $32,000 annually depending on education, experience and skills. Very senior economists may earn up to $76,000.

The 1986 Census indicated the average wage for all those in this occupation in B.C. was $31,000, and $37,800 for those working full-time over the whole year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,150	1,060	1,200

Annual Growth 1987-1995: 1.6%

Main Industries of Employment 1986 Census

Economic Consulting	30%
Government	21%
Finance, Insurance & Real Estate	12%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
150	150	300

Nature of the Work

Specialties include child, educational, industrial, research, and rehabilitation psychology as well as mental health counselling and neuropsychology. Psychologists study individual behaviour, such as thinking, learning, memory, decision making, emotions, and personality. They use questionnaires and controlled experiments to test data and form hypotheses. They provide information on intelligence and the effects of environment, heredity and other factors on emotions, thought, behaviour and health.

In applied fields psychologists counsel, train, provide psychological services, and do market research. Research psychologists investigate behaviour through experiments on humans and animals. In colleges and universities, they combine teaching with research and administrative duties.

Slightly less than half of those in this profession are women. The average age has been increasing partially due to higher average educatio[illegible]ome in this profession move into administrative or managerial positions.

Education and Skills

A career as a psychologist or university teacher and researcher can require up to ten years of formal education beyond high school. The process begins with completion of a bachelor of arts or science degree in psychology, then a two year master's degree followed by a four year doctoral (Ph.D.) degree. Undergraduate and graduate programs in psychology are available at all B.C. public universities. Most community colleges offer university transfer courses in psychology up to the second year.

Clinical and counselling psychology may require a further period of practical training and internship. Secondary studies in mathematics and the natural sciences are definite assets. Although a master's degree is the minimum, a Ph.D. is required for most jobs.

To be a licensed psychologist, the B.C. Psychological Association requires a Ph.D. degree, at least one year of postgraduate work experience and at least one year of B.C. residency.

Psychologists must be emotionally stable, mature and have the ability to lead and inspire others. Patience and perseverance are also necessary qualities because treatment results are often long in coming.

B.C. Job Prospects

From 1971 to the mid-80s, employment growth was greater than the average for all occupations. The outlook to 1995 is for an average growth in jobs. About 110 newly created positions and 100 jobs arising from people leaving the occupation will create a total of 210 openings over this period. This will remain a very small occupation in B.C.

Social and economic changes increase the demand for psychologists. However, with tight government budgets in health services and hospitals, opportunities for psychologists may be subdued. However, clinical psychologists and those in correctional centres should enjoy good job prospects.

About 62% work in welfare and health services, 19% in education, and 17% in government. Most work full-time, although part-time has been increasing. This is a small occupation in B.C. and is affected by provincial and federal expenditures.

Earnings

Psychologists employed by the federal government in 1986 averaged from $26,100 to $34,400, at the entry-level. Middle to senior positions range from $39,600 to $60,800.

The 1986 Census indicated that in B.C. the average employment income for all those in this profession was $25,300, and $35,316 for those working full-time over the whole year.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	610	780	890

Annual Growth 1987-1995: 1.7%

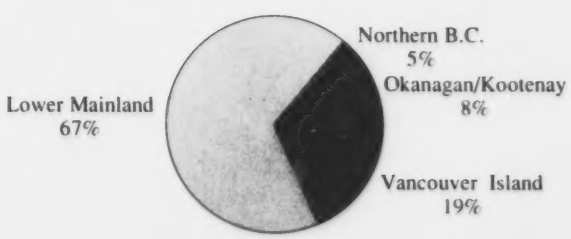
Main Industries of Employment 1986 Census

Welfare & Health Services	62%
Education	19%
Government	17%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
110	100	210

Employment by Region



Nature of the Work

Welfare agencies, housing authorities, group homes, correctional institutes, school boards, adoption agencies and retirement centres employ social workers. They may work with the poor, troubled youth, the unemployed, victims of crime, the sick, the disabled, or families. Job titles include social worker, financial aide worker, adoption agent, family counsellor, parole officer, and welfare case worker. They may act as advocates for their clients for needed services, particularly where health and social services are limited. They may also initiate legal action, for example to place a child in foster care.

Women constitute over 60% of all social workers.

Education and Skills

About 60% of those in this group hold an undergraduate university degree, primarily in social work, but also in related fields of sociology and psychology. Those with master's degrees constitute about 20%, primarily in social work, sociology or education.

Graduation from a two year community college social work program is required for paraprofessional positions such as financial aid workers, but competition is increasing and all social workers should now hold at least a Bachelor of Social Work (B.S.W.) Degree. Advanced or administrative positions may require a Master's Degree (M.S.W.). Experience through volunteer work is a strong asset when pursuing a social work career and expertise gained on the job is important for career advancement.

UBC offers a four year B.S.W. and a one year M.S.W. with concentrations in family needs, health needs and socioeconomic needs. UVic offers a B.S.W. program for those interested in practicing social work in rural communities, small towns and northern settings in Canada, which is available through a distance education program.

Parole officers require a bachelor's degree in sociology, psychology, social work or criminology and a master's degree is increasingly important. Probation officers need two years of college in social work, criminology, psychology or sociology plus five years experience as a minimum. However, as with parole officers, most now hold university degrees. Bachelor's programs in sociology and psychology are available at all B.C. public universities with only SFU offering criminology degree programs.

Workers in these occupations should be emotionally stable and have a genuine concern for the well-being of others.

B.C. Job Prospects

Employment growth for social workers grew more than the all-occupation average from 1971 to 1986 and now is a very large occupational group in B.C. The outlook to 1995 however is for slower than average growth. About 1,360 opportunities should arise over this time, with more due to attrition within the occupation than from new jobs being created.

About half work directly in government, primarily the provincial government. Another 44% work in the welfare and health services sector. Jobs are not lost during economic downturns and demand may even increase in poor economic times. However, this occupation is sensitive to government spending.

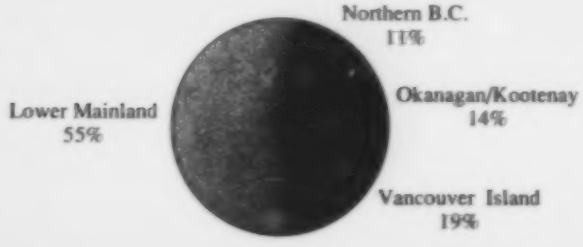
Most social workers work full-time throughout the year, with a growing portion (7%) working permanent part-time.

Earnings

The average employment income in B.C. for all people in this profession was $20,000, and $26,000 for the 54% of those working full-time for the whole year, according to the 1986 Census.

Entry-level salaries in 1989 for social workers with the B.C. Government ranged from $25,700-$32,400; intermediate to senior positions ranged from $28,000-$39,900.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,230	5,250	5,830

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Government	50%
Welfare & Health Services	44%
Education	4%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
590	770	1,360

2333 Occupations in Welfare and Community Services

Nature of the Work

This group includes social service assistants, home support workers, child welfare workers, charity workers, and community service workers. Social service assistants work alone or with a team of social workers, psychiatrists, physicians and teachers. They're concerned with the well-being of disturbed individuals, families and children. They assess needs and provide treatment, such as reality therapy, behavior modification, play therapy and individual or group counselling.

Child care workers may counsel individuals and families in their own homes, or in group homes and treatment centres. Other settings include schools, community clinics, detention centres, hospitals and social service agencies.

The number of women in this large occupational group has increased to 80%. However a low portion of people in this field (30%) work full-time over the whole year.

Education and Skills

Employment usually requires completion of a one to two year community college program. The Social Service Worker Program is offered at several B.C. colleges and requires Grade 12 or mature student status for both the one year certificate and two year diploma.

Long term care aide/home support worker programs are offered by community colleges throughout B.C. All last from 15-16 weeks and require Grade 10 or the equivalent.

College graduates who want to pursue a degree in social work receive partial credit towards the Bachelor of Social Work Degree at UVic or UBC. Three years of university may be required for supervisory or administrative positions.

A number of specialized programs are also available at colleges, including: child care counsellor; early childhood education and care; handicapped services worker; outdoor recreation; recreation leadership; sign language communicator; special education assistant; therapeutic recreation technician; and substance abuse counselling.

Workers should have emotional stability and a genuine concern for the well-being of others. Volunteer experience is a definite advantage when looking for work in this area.

B.C. Job Prospects

From 1971 to 1986 employment grew faster than average and this is now considered a very large occupational group in B.C. Employment growth to 1995 will be about average based on employment projections for the government sector. Nearly 4,000 jobs are expected in this area over the outlook period.

Over 70% of employment is in government welfare services, with about 20% in other areas of government. Employment isn't generally affected by economic downturns, and such times may even increase demand.

Demand for these workers is tied to government spending on social services. Therefore changes in government spending in this area have a direct impact on employment opportunities for this occupational group.

Social changes may also influence employment demand. As the population ages, more services will be needed for senior citizens and as more community rehabilitation services become available, more specialized staff will be needed to assist disabled persons.

Earnings

Graduate child care workers' entry-level salaries range from $13,000-$28,000 and average $18,000-$20,000. Varying types of work and facilities account for this extreme range. With additional education and experience, a child care worker can earn up to $30,000 a year.

According to the 1986 Census the average income for workers in B.C. was $10,300, and $19,000 for the 29% of full-time, full-year workers. This difference reflects the large component of part-time and/or part-year workers.

Related Occupations

Social Workers; Parole Officers

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,460	11,090	12,620

Annual Growth 1987-1995: 1.6%

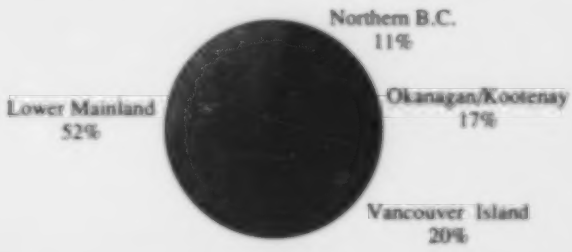
Main Industries of Employment 1986 Census

Welfare & Health Services	74%
Government	17%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,530	2,370	3,900

Employment by Region



Nature of the Work

Lawyers and notaries interpret law and advise business and individuals. They may specialize in corporate law (securities and corporate tax) and commercial law (import-export, currency controls, or bankruptcy). Labour lawyers advise on policy, wage trends and negotiate for their clients. Criminal lawyers defend those charged with crimes. Other specializations include industrial, property, family, estate, municipal law and litigation. Notaries draft and file property mortgages, leases and transfer documents as well as draw up and execute last wills and testaments.

This is a large occupation with strong female participation. The proportion of women grew from 5% in 1971 to 21% in 1986 and about half of first year UBC law students are now women. Employment is generally stable but employment and the business itself can be affected by economic downturns.

Education and Skills

Admission to the B.C. bar requires at least three years of undergraduate education, a Bachelor of Laws (L.L.B.) Degree, 12 months of articling, and passing the Bar Admission Course. Acceptable undergraduate programs are available at all B.C. public universities.

UBC and UVic offer three year law programs. Applicants must write the Law School Admission Test (LSAT) and only those with the highest grades and LSAT scores are selected. UVic has special dispensations for admitting mature applicants and both universities have special dispensations for admitting Canadians of Indian, Metis and Inuit backgrounds. UBC also offers a combined program for a Bachelor of Laws and Master of Business Administration.

Following law school, lawyers must article for a year under the supervision of a practicing lawyer. The practice of law requires responsibility, integrity and honesty. A criminal record may prevent one from becoming a lawyer. Perseverance and reasoning ability are essential to analyze complex cases.

For lawyers specializing in corporate law (securities and corporate tax) and commercial law (import-export, currency controls, or bankruptcy), a background in commerce, finance or accounting is an asset.

The B.C. Society of Notaries Public in Vancouver has a required course. To complete it and pass the government-supervised final examination takes a minimum of one year. Applicants must be at least 25 years old, a Canadian citizen, a B.C. resident, a high school graduate, and have two years experience in a related field such as real estate or insurance. Applicants may not have a criminal record and personal backgrounds are checked before acceptance.

B.C. Job Prospects

This is a large profession in B.C. and from 1971 to 1986, employment grew faster than average. The outlook to 1995 is for continued higher than average growth with a total of 2,030 openings from new jobs and attrition. This outlook is based on prospects for business services, which employs 91% of lawyers, and government, where 6% are employed.

Demand for legal services and specialties are affected by legislative changes. Growth specialties include constitutional law, consumer protection, family law and corporate-securities law.

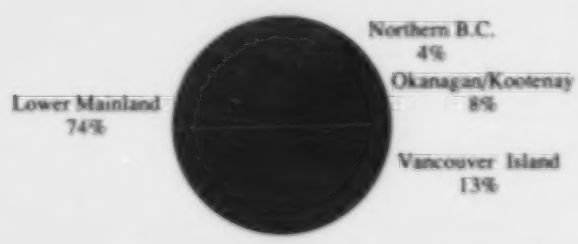
While unemployment among lawyers is extremely low, obtaining an articling student position can be difficult and frequently requires moving outside the Vancouver area.

Earnings

In 1986 a legal assistant's average salary ranged from $25,500-$38,200. An attorney's salary ranged from $26,000-$61,400. Senior attorneys ranged from $53,600-$72,500. Senior legal partners of large firms may have incomes in excess of $200,000 a year, including profit sharing and bonuses.

According to the 1986 Census, the average employment income for all lawyers and notaries in B.C. was $56,200 for those working full-time over the whole year and $51,997 for all those in this group.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,620	5,980	7,090

Annual Growth 1987-1995: 2.1%

Main Industries of Employment 1986 Census

Legal Firms	91%
Government	6%
Miscellaneous Services	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,100	930	2,030

2351 Librarians, Archivists and Conservators

Nature of the Work

Contemporary librarians, aided by computers, acquire and organize library collections, and assist users in finding information. They work in federal, provincial and municipal libraries as well as colleges, universities, corporate and private research libraries.

Archivists select, evaluate and acquire historical photographs, maps, films, tapes, and private manuscripts for universities, museums and government. They may also authenticate records, index and classify sources, and provide public research services.

Conservators preserve and restore historic objects and art in archives, museums and universities. They use ultraviolet photography, radiography and microscopic examination to help restore paintings, photographs, pottery, antiques, and documents. They may also do research, prepare reports and advise on artifacts' condition.

Over 80% are women and a large portion, 15%, work year-round part-time. Most employment is in the education and educational services sector (82%); 6% are in business and library services and 5% in government.

Education and Skills

Increasingly the minimum requirement is a bachelor's degree followed by a Master's Degree in Library Science (M.L.S.), which is available at UBC's School of Library, Archival and Information Studies. Applicants require reading knowledge of at least one other language besides English and one year of library work experience. To become librarians in the public school system requires teacher certification and a degree in education, with courses in school librarianship through the faculties of education at both UBC and UVic.

Archivists usually require a master's degree in history, archival studies or library science. UBC's School of Library, Archival and Information Studies offers a Master's Degree in Archival Studies. Other postgraduate programs include UVic's Advanced Studies in Cultural Resource Management and SFU's Extended Studies Diploma in Public History.

Conservators normally hold a M.A. or Ph.D. degree in art conservation. Although not offered in B.C., archivists' programs include courses useful to those interested in careers as conservators. Fourth year courses in the conservation of organic and inorganic materials are offered by UBC's Department of Anthropology through a hands-on approach at the Museum of Anthropology. The only graduate program in art conservation in Canada is offered by Queens University in Ontario.

Knowledge of computers, particularly specialized library systems and databases, is useful as libraries automate. A knowledge of chemistry is an asset to conservators.

B.C. Job Prospects

While relatively unaffected by business cycles, employment is sensitive to technological change and government expenditures which combined to reduce numbers from 1981 to 1986. The outlook to 1995 is for employment growth lower than the all-occupation average. It is projected that 150 new jobs will be created with twice as many opening up due to attrition, for a total of 450 openings. However, by 1995 the employment of almost 1,600 will still be lower than the high of 1,700 reached in 1981. The prospects are best for people specializing in scientific and technical fields, particularly in research libraries, and for those with good computer skills, or interested in business research.

Earnings

According to the 1986 Census, the average employment income in B.C. was $20,700 for all librarians, and $29,400 for full-time, year-round workers. Salaries for B.C. Government archivists in 1986 ranged from $28,100-$31,800.

Librarians in the lower mainland working in public libraries in 1989 had salary ranges from $25,800-$33,500 in 1988. Federal government librarians ranged from $21,900-$29,000 in entry level positions and from $31,600-$47,500 in middle to senior positions.

Related Occupations

Library Clerks

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,720	1,410	1,570

Annual Growth 1987-1995: 1.3%

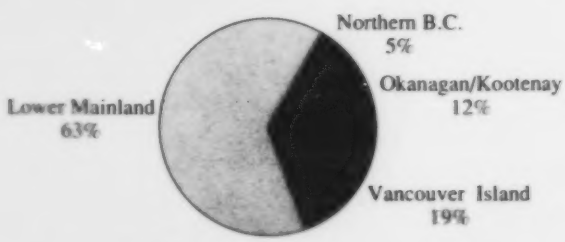
Main Industries of Employment 1986 Census

Schools & Public Libraries	82%
Business & Information Services	6%
Government	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
150	300	450

Employment by Region



Nature of the Work

Specialities within this group include educational advisors, group development workers and vocational counsellors. They work in the education system as well as in business, industry, government and community agencies. Not only do they help people make career decisions, whatever their age, they also encourage development of the life skills necessary for coping in a changing society.

Career counsellors assess a client's needs and then provide counselling. Testing may be used to uncover abilities, skills, aptitudes, interests and motivation. After analyzing results, these are reviewed and job hunting techniques discussed with the client. Counsellors may specialize in the retired, disabled, women, ethnic groups, immigrants, prison inmates, apprentices or unemployed.

About 60% of this occupational group are women and many people enter this field later on in their careers.

Education and Skills

A bachelor's degree followed by a master's degree in counselling psychology, psychology or social work is the minimum requirement. A doctorate in counselling psychology is becoming increasingly important. In most school systems, counsellors must be certified teachers.

UBC's Department of Counselling Psychology offers degrees at the master's and doctoral level. Master's program applicants must have a bachelor's degree, usually in education or arts, and have three years paid or volunteer experience.

SFU's Faculty of Education offers a Master's in Instructional Psychology with an emphasis on counselling in educational settings. UVic's Faculty of Education offers a Master's in Counselling Psychology in Education and in School Counselling. UBC offers a Bachelor's and Master's in Social Work, and UVic a Bachelor's Degree.

Graduate programs in psychology are available at all B.C. public universities. Those interested in counselling should have a strong interest in helping others and the ability to inspire respect, trust and confidence.

B.C. Job Prospects

Most counsellors (84%) work in the education field, while 9% are employed by government. Jobs tend to be recession-resistant but they are influenced by provincial funding of education services and by school enrollments.

Employment growth from 1981 to 1987 was almost flat in this very small job group. Currently there is a very high and well above average unemployment in this occupation. Employment growth to 1995 will be less than the all-occupation average, based on the outlook for the B.C. education sector. A total of 170 new opportunities should be created by 1995, with about half coming from newly created jobs and half from attrition at existing jobs.

Changing education patterns may increase the demand for counsellors. For example, the trend toward continuing education increases the student population and the number of students needing counselling services. Affirmative action and employment equity programs may increase the demand for counsellors who assist special-need clients.

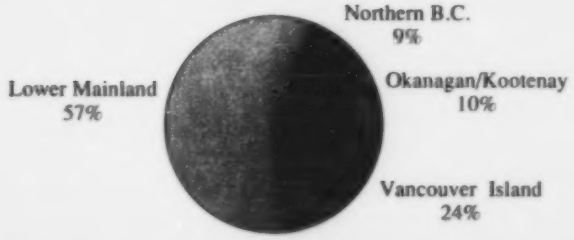
Increased secondary school enrollments in the early 1990s should increase demand from schools, but fiscal constraints may limit opportunities. Those counsellors who can serve older students may have more opportunities as the B.C. population ages.

Earnings

Counsellors' salaries vary among organizations. Those in the public school system earn the same as teachers. Salaries for B.C. government counsellors in apprenticeship and industrial training in 1986 ranged from $26,983-$40,615.

The average employment income for those in this occupation in B.C. was $27,400 and for those working full-time over the whole year, $33,900, according to the 1986 Census.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	830	870	970

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Education	84%
Government	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
90	80	170

27

Teaching and Related Occupations

Nature of the Work

This occupational group includes all teaching positions at the university level: professor, associate professor, assistant professor and instructor. Faculty members generally teach several different courses in the same field, including lecturing in classrooms that seat hundreds of students and leading seminars for only a few. In addition to preparing teaching material, giving lectures, supervising graduate students and marking student assignments, university teachers must produce timely publications, participate in conferences in their specialized area of research, and assume administrative responsibilities for their department. University teachers generally have flexible schedules, especially during the summer and school holidays. They may work staggered hours and teach classes at night.

Education and Skills

Increased competition for faculty positions has made completion of a Ph.D. almost essential, although some part-time and instructor positions are held by those with master's degrees or graduate students completing their doctorates.

Doctoral programs usually require two years or more of study beyond the master's degree, including intensive research for a doctoral dissertation that makes an original contribution to the candidate's field of study. A working knowledge of one or more foreign languages and, in many fields, advanced mathematical, statistical and computer knowledge is often required as well. Programs are available at all three B.C. public universities. Studies may be started with a one to two year university transfer program available at community colleges or by completing an undergraduate degree.

University teachers need inquiring, analytical minds and a strong desire to pursue and disseminate knowledge.

B.C. Job Prospects

Job growth in this occupation was below average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow more slowly than the average for all other occupations because demographic and financial constraints make rapid growth in this sector improbable. However, this is a fairly large job group in B.C. with the number employed in 1995 expected to be 3,140. This includes an estimated 310 new job openings and 480 replacement opportunities expected over the projection period. Replacement openings caused by retirement are expected to be slightly higher than in other occupations because the experienced labour force in this field is older than average.

Employment in this occupation is susceptible to changes in provincial government spending and although not directly susceptible to fluctuations in the economy, a recession could further limit university funding. Universities are turning to short-term contracts and to part-time faculty to save money. Technological changes in the work place generally involve teaching aids and therefore would not likely affect employment levels. More and more women have chosen this profession over the last several years, with their representation increasing from 18% to 27% between 1971 and 1986.

Earnings

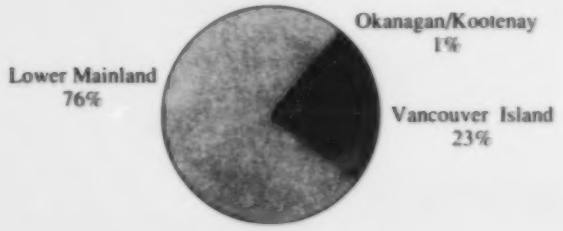
On average, 1986 pay scales in Canada ranged from $30,600 for lecturers and $47,800 for associate professors, to $62,000 for full professors.

The average annual employment income of this job group in B.C. was approximately $36,100 in 1986. Sixty percent were employed full-time, full-year, and these workers' earnings averaged $46,900.

Related Occupations

Lobbyists, Consultants and Policy Analysts.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,050	2,830	3,140

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Education 100%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
310	480	790

Nature of the Work

This group includes occupations concerned with assisting university faculty members in teaching and research activities such as Audiovisual Materials Assistant and Laboratory, Research or Teaching Assistant. Teaching Assistants are graduate students pursuing their own advanced studies who are employed part-time to teach lower level courses and grade exams or papers.

This occupational group also includes instructors in university extension courses or continuing education. The majority of these are non-credit or are for career purposes, educational upgrading or to help students improve the quality of their lives by improving their health or expanding their general knowledge. Most instructors in continuing education work part-time. Many courses are offered at night or on weekends, and range from one-day mini-sessions to courses of standard semester length.

Education and Skills

Instructors in university or college extension courses (continuing education) do not necessarily require a university degree. Extensive experience in their field, supplemented by an instructor training program, may be sufficient.

For those wishing to teach ESL (English as a Second Language) to adults at the college level, a bachelor's degree in linguistics, education, or a related field is the minimum requirement along with ESL training through either a university or college. For those wishing to teach ESL overseas, many countries such as Japan will not issue work permits to prospective teachers without proof of a bachelor's degree. All three public universities offer undergraduate courses in ESL. UBC also offers a diploma in ESL for certified teachers and SFU has a master's degree in education with a specialization in ESL. UVic offers a bachelor's and master's linguistic program with an emphasis on teaching ESL. Vancouver Community College offers a certificate program in Teaching English as a Second Language (TESL) for those wishing to learn practical teaching for adults.

B.C. Job Prospects

Although job growth in this occupational group was well above average between 1981 and 1987, projections to 1995 call for jobs to grow more slowly than the average for all occupations. However, this is a fairly large occupation in B.C. with the number of jobs in 1995 expected to be about 2,250. This includes an estimated 220 new job openings and 300 replacement opportunities expected over the projection period. Employment in these teaching positions is dependent on provincial government spending and, although not directly susceptible to fluctuations in the economy, a recession could further limit university and college funding.

More and more women have chosen this profession over the last several years, with their representation increasing from 25% to 45% between 1971 and 1986. Only three out of ten of these jobs were full-time, full-year in 1986. Opportunities for teaching ESL are limited as there is now a surplus of teachers in B.C.

Earnings

The average annual employment income of this job group in B.C. was approximately $11,000 in 1986. Only 28% of this work force was employed full-time, full-year, and these workers' earnings averaged $24,300.

Related Occupations

Vocational and Academic Counsellors, Public Relations Specialists and Employee Development Specialists.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,320	2,030	2,250

Annual Growth 1987-1995: 1.3%

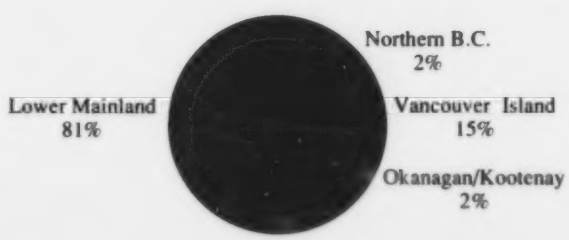
Main Industries of Employment 1986 Census

Education 100%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
220	300	520

Employment by Region



Nature of the Work

Elementary school teachers instruct children from kindergarten to Grade seven. They may teach all subjects, but in many schools there are specialists for physical education, art, music and library. In addition to teaching the basic curriculum, kindergarten teachers have the responsibility of developing attention skills; of helping the children acquire personal and social habits; and of stimulating them to ask questions, discover answers and learn how to cope with problems. As trends toward the integration of exceptional pupils into mainstream classes progress, elementary and kindergarten teachers will be called upon to acquire additional specialized teaching skills to deal with these pupils. Teachers monitor their pupils' progress and discuss their needs with parents and other educational professionals. Their day is often prolonged by participation in extra-curricular activities.

Day-care or preschool supervisors (early childhood education and care) work with young children in day-care centres, preschools, hospital playrooms, special education centres, family service centres and other licensed child care facilities outside the home. Their duties include looking after the mental, physical and emotional needs of young children: including health, safety and nutrition; program planning and assessment; administration duties; and developing rapport with families.

Education and Skills

Certification from the Ministry of Education is required to be an elementary and kindergarten teacher in the B.C. public school system. A Standard Teaching Certificate is awarded to individuals who have completed a three year approved program of post-secondary studies, and a Professional Certificate to those who have completed a minimum four year approved program. Programs for both certification levels are available at all three public universities.

Nine to twelve month certificate programs in Early Childhood Education and Care (ECEC) are offered at most community colleges. Graduates of the ECEC program qualify as assistant preschool or day-care supervisors with the provincial Child Care Facilities Licensing Board. Following 500 hours of documented satisfactory work experience, and some additional course work, the graduate is entitled to apply for registration as a fully qualified preschool or day-care supervisor. Admission requirements to the ECEC program include Grade 12, letters of reference and strong English language skills. Programs in early childhood education are also available at all three public universities.

B.C. Job Prospects

Job growth in this occupation was below average between 1981 and 1987 and projections to 1995 call for jobs to grow more slowly than average. However, this is a very large job group in B.C. with the number employed in 1995 expected to be almost 20,900. This includes an estimated 2,100 new job openings and 3,140 replacement opportunities expected over the projection period. As the children of the current baby boom move into elementary school, the demand for elementary teachers will increase a little. Provincial funding, however, will also be a determining factor for employment growth.

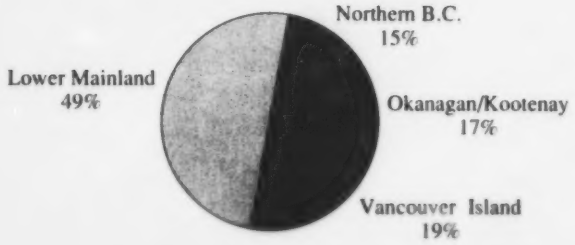
Part-time work exists mainly in the form of substitute teaching. While technological change is improving teaching methods (computers, advanced teaching guides), it is not expected to affect employment patterns. Women predominate in this profession, with a representation of almost 80%. Employment prospects for preschool or day-care supervisors are excellent.

Earnings

In 1986, the average annual employment income of B.C. elementary school teachers who worked full-time throughout the year was approximately $30,600. The 1989 annual wages for teachers in private schools range from about $19,000-$30,000. For teachers in public schools the approximate range is $21,200 to $48,900, with the higher figure paid to a teacher with a master's degree and at least 11 years teaching experience.

The 1989 wages for day-care assistants range from $780-$1,500 (non-union) and $1,100-$1,600 (union) per month. The respective figures for day-care supervisors are $900-$1,600 and $1,200-$1,800.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	19,030	18,790	20,880

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Education	94%
Hospitals	6%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,100	3,140	5,240

Nature of the Work

Secondary school teachers instruct students from Grades eight to twelve. Like teachers at the other levels, this group is responsible for providing a basic curriculum of courses, however, most if not all teach subjects in which they are trained specialists. Secondary school teachers must spend time researching their subjects, preparing background materials for lessons, and deciding how to present topics so as to stimulate student interest. They frequently become involved in extra-curricular activities.

Education and Skills

To teach in a public secondary school in B.C., certification by the Ministry of Education is required. Secondary school teachers in B.C. require a Bachelor of Education Degree (B.Ed.) with a concentration in one or two subjects widely taught in the secondary school system.

UBC offers a two year B.Ed. program for students who have completed an approved bachelor's degree in subjects included in the secondary school curriculum. It is recommended that students planning to apply for the program take an introductory course in education as part of their undergraduate degree program as well as other recommended courses. UBC also offers special programs for those wanting to teach French, industrial education or mildly handicapped students.

SFU has a five year B.Ed. program which requires students to complete a major (or two minors) in subjects included in the secondary school curriculum; a minor in education; and completion of the Professional Development Program (PDP). Minors in secondary education at SFU include environmental education and learning disabilities.

UVic offers a five year B.Ed. program. It includes a professional year in which students gain teaching experience in schools. UVic also has a two year professional program for students who have already completed an undergraduate degree. Students are eligible for certification after the first year, and receive a B.Ed. degree after the second year.

B.C. Job Prospects

Job growth in this occupation was below average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow more slowly than the average for all other occupations. However, this is a very large job group in B.C. with the number employed in 1995 expected to be almost 13,700. This includes an estimated 1,330 new job openings and 1,700 replacement opportunities expected over the projection period. Given the current demographic situation, the demand for secondary teachers should increase in the last few years of the forecast period. Teachers of math, science and French Immersion generally have better opportunities.

As at all teaching levels, there is some part-time work, mainly as substitute teachers. The representation of women in this profession has increased steadily since 1971, with 42% of positions in 1986 filled by women.

Earnings

In 1986, the average annual employment income of secondary school teachers in B.C. who worked full-time throughout the year was approximately $36,200. Annual wages in 1989 for teachers in private schools range from about $19,000-$30,000. For teachers in public schools the approximate range is $21,200-$48,900, with the higher figure paid to a teacher with a master's degree and at least eleven years teaching experience.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	13,720	12,340	13,680

Annual Growth 1987-1995: 1.3%

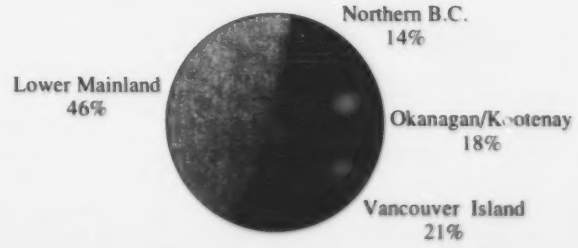
Main Industries of Employment 1986 Census

Education 100%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,330	1,700	3,030

Employment by Region



Community College and Vocational School Teachers

2791

Nature of the Work

Community college and vocational teachers generally teach courses related to their field of specialization. There are three major categories in the B.C. community college system: one to two year academic, university transfer programs; one to two year career and technology programs; and trades (vocational/technical) programs of up to one year. In addition, there are programs offered in continuing education, adult basic education, English as a Second Language (ESL) and special education. BCIT offers two year programs within its schools of business, engineering technologies and trades, and health sciences. BCIT also offers vocational/technical programs similar to those at community colleges.

Most instructors teach classes by means of lectures, demonstrations or lab work. Instructors in the skill-training programs employ a hands-on approach, supervising their students in independent or group projects. Unlike university professors, they are not required to do research but they must stay abreast of developments in their area of expertise. Evening and/or weekend work is sometimes required.

Education and Skills

College instructors teaching university transfer courses need a master's degree in their subject area. Adult basic education instructors usually require a Bachelor of Education (B.Ed.) degree. It is recommended that instructors of career and technology programs have a minimum master's degree along with extensive experience, although those with bachelor's degrees may find part-time, entry-level positions. Some instructors of trades (vocational/technical) do not need post-secondary education, and are qualified with expert knowledge and extensive working experience with a Trades Qualification (TQ) Certificate. However, completion of a program such as the Industrial Education Teacher Program offered jointly by UBC and BCIT or the Provincial Instructor's Diploma Program offered by Vancouver Community College is now recommended.

The proportion of women employed as college and vocational school instructors almost doubled from 25% to 49% between 1971 and 1986.

B C. Job Prospects

Between 1981 and 1987 employment growth among community college teachers was above average, a direct result of the increase in college enrollment and overall growth in the number of institutions. Now that expansion in these areas has leveled, employment projections to 1995 call for jobs to grow more slowly than the average for all other occupations. However, this is a fairly large occupation in B.C. with the number employed in 1995 expected to be 3,830. This includes an estimated 380 new job openings and 690 replacement opportunities expected over the projection period.

Part-time employment is widely available in this job group. Instructors may be hired for several semesters or on short-term contracts. Although seasonality is a structural characteristic of the occupation, it is not nearly as pronounced as at the elementary or secondary teaching levels, since many community college and technical institutions offer summer courses. Technological changes affecting this occupation are improving teaching methods through the application of computers and, in a technical setting, specific technical machinery. However, as in other areas of teaching, these changes are not expected to alter employment patterns.

Earnings

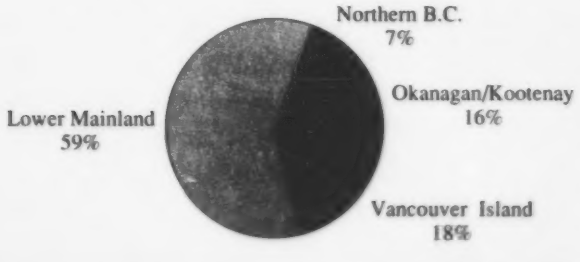
The average annual employment income of this job group in B.C. was approximately $26,400 in 1986; 46% were employed full-time, full-year, and these workers' earnings averaged $37,900.

The 1989 annual wages for full-time community college instructors (academic) range from $27,900-$47,500. The hourly rate for part-time instructors is $19.60-$33.10 (vocational) and $34.50-$57.50 (academic).

Related Occupations

Vocational and Academic Counsellors, School Administrators and Employee Development Specialists.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,190	3,440	3,830

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Education	97%
Federal Government	1%
Personal Services	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
380	690	1,070

Nature of the Work
This classification includes instructors of individuals or groups in art, music, drama or dancing in private homes, studios, academies and similar establishments. It includes piano, elocution and dancing teachers. Employment is primarily part-time and includes evening and weekend work. These teachers should enjoy working with people and feel real satisfaction from sharing their knowledge with others. They also need good communication skills and the ability to motivate others.

Education and Skills
There are no specific education requirements for employment in these jobs. Although training and experience requirements vary, two to four years of study in a university department of art or conservatory of music is usually required. A bachelor's degree is preferred. Douglas College offers a two year Bachelor of Music (university transfer) program and Vancouver Community College offers a transferable two year program in which students may specialize in areas such as orchestral instruments, composition, and voice. Camosun College offers a two year diploma program, in association with the Victoria Conservatory of Music, that concentrates on performance and teaching. A number of colleges also offer two year fine arts and theatre programs that lead to a Diploma and/or to university transfer. The Emily Carr College of Art and Design offers a four year program leading to a Diploma in Fine Arts. Admission is based on an assessment of high school marks and ability as evidenced by a portfolio.

B.C. Job Prospects
Although job growth among these instructors was above average between 1981 and 1987, projections to 1995 call for jobs to grow more slowly than the average for all other occupations. However, this is a fairly large job group in B.C. with the number employed in 1995 expected to be 3,140. This includes an estimated 340 new job openings and 820 replacement opportunities expected over the projection period.

In B.C., most of these workers are employed in the education and recreation sectors, as well as government.

Employment patterns in this occupational group tend to be very sensitive to economic conditions. More and more women have chosen these jobs over the last several years, with their representation increasing from 62% to 75% between 1971 and 1986. Opportunities for part-time work abound; in fact, only one out of ten people worked full-time over the whole year, in 1986.

Earnings
In B.C. the average annual employment income of these instructors was approximately $10,100 in 1986. Only 12% of this work force was employed full-time, full-year, and these workers' earnings averaged $20,700.

The 1989 hourly rate for private music teachers ranges from about $10.00-$17.00 (individual instruction) and from $25.00-$40.00 (group instruction).

Related Occupations
Art/Music/Dance Critics, Drama Coaches and Music Therapists.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,340	2,800	3,140

Annual Growth 1987-1995: 1.5%

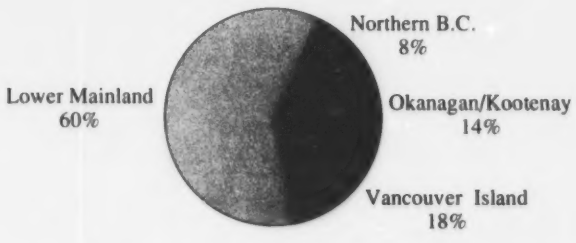
Main Industries of Employment 1986 Census

Education	74%
Recreation	11%
Government	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
340	820	1,160

Employment by Region



31

Occupations in Medicine and Health

Physicians and Surgeons 3111

Nature of the Work
Medicine is regarded as one of the most prestigious and challenging of professions and it offers independence, job satisfaction, high income and security. While most physicians are general practitioners or specialists in private practice, they also work as public health officers, research scientists, teachers or administrators. There are about thirty specialties, the largest of which are surgery, internal medicine, obstetrics and gynaecology, anaesthesiology, paediatrics, psychiatry, dermatology, ophthalmology, cardiology, radiology, laboratory medicine and orthopaedic surgery. Practicing physicians usually work long, irregular hours, often under stress.

Education and Skills
UBC offers a four year M.D. program. Prerequisites include completion of a minimum of three full years in a faculty of science or arts, including an approved premedical program; passing of the Medical College Admission Test (MCAT); personal suitability; and a minimum overall grade average of 70%. Prospective students are advised that the number of qualified applicants greatly exceeds the number of places in the Faculty of Medicine and that the academic standing of those admitted in recent years has been considerably above this minimum required grade. Although admission to the M.D. program is based primarily on scholastic standing, personal qualities and age are also considered. Those who are interested should obtain specific admission criteria from the Dean of Medicine. Following the four year M.D. program, students are required to undertake at least one year of postgraduate medical education (residency) in an accredited hospital. Careers in medical specialties require a further four to five years of specialty training depending on the area.

B.C. Job Prospects
Although job growth in this occupation was about average between 1981 and 87, projections to 1995 call for jobs to grow faster than the average for all other occupations. This is a fairly large job group in B.C. with the number employed in 1995 expected to be over 7,140. This includes an estimated 1,060 new job openings and 1,400 replacement opportunities expected over the projection period. Although there is currently a surplus of doctors in B.C. and the supply is projected to rise faster than the population (whether or not adjusted for changing age structure) by 1% to 2% per year, there remains a "maldistribution" of practitioners geographically. Because physicians have tended to cluster in urban areas, some remote and rural locations are experiencing a shortage of doctors.

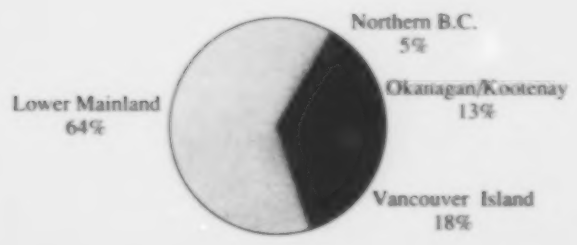
The employment of physicians is strongly affected by government spending policies. Although B.C. no longer restricts physician billing numbers, it plans to impose a Regional Prorating System in an attempt to contain health care costs and to provide incentive for physicians to relocate to underserviced regions. Under this system, services provided to residents of relatively "underserviced" areas will automatically be reimbursed at a higher rate than those provided to residents of relatively "overserviced" areas.

Almost 80% of doctors in B.C. are self-employed practitioners, with the remainder employed in research or teaching institutions or as staff physicians in hospitals. There is currently a shortage of doctors in hospital staff positions in psychiatry and laboratory medicine specialties, especially in Northern B.C. With the growth of the older segment of the population, there will be a redistribution of specialists needed, such as cardiologists and geriatrics specialists. The female proportion of this labour force increased from 10% to 18% between 1971 and 1986.

Earnings
While physicians and surgeons may earn more than $200,000 a year, 40% or more of a physician's gross income is spent on overhead items such as staff, stock, capital equipment and office space.

The average annual earnings of all B.C. physicians were approximately $81,900 in 1986. Fifty-four percent were employed full-time, full-year, and these workers' incomes averaged $90,200.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,900	6,080	7,140
Annual Growth 1987-1995		2.0%	

Main Industries of Employment 1986 Census

Physicians' & Surgeons' Offices	79%
Hospitals	14%
Education	4%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,060	1,400	2,460

Nature of the Work

Dentists are as concerned with patient education and prevention services as they are with filling cavities, straightening teeth, treating gum disease, providing artificial dentures and performing corrective surgery of the gums and supporting bones. While most dentists are general practitioners, there are nine recognized dental specialties in Canada. Orthodontists straighten teeth; oral surgeons operate on the mouth and jaws; periodontists treat the gums; and endodontists do root canal therapy. Most dentists work in private practice, usually working some evening and weekend hours. Some dentists practice in 24 hour clinics in shopping malls or community centres. Many dentists continue to practice part-time beyond the usual retirement age.

Education and Skills

UBC offers a four year program in dentistry leading to the Doctor of Dental Medicine (D.M.D.) degree. Admission to the program includes completion of three academic years in a faculty of arts or sciences program, including approved prerequisite courses; passing an aptitude test; letters of recommendation; and personal interviews. A minimal scholastic average of 65% is required, but because competition for admission is so high fulfillment of the minimum requirements does not guarantee admission. UBC also offers advanced degrees for practitioners and students wishing to enter specialty practice, teaching or research. Registration and licensing by the College of Dental Surgeons of B.C. is mandatory.

Dentists should have a high degree of manual dexterity, good visual memory, excellent judgment of space and shape, and scientific ability. Good business sense is helpful for success in private practice.

B.C. Job Prospects

Job growth in this occupation was above average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow faster than the average for all other occupations. This is a fairly large size occupation in B.C. with the number employed in 1995 expected to be over 2,320. This includes an estimated 360 new job openings and 310 replacement opportunities expected over the projection period. As with any profession in which self-employment predominates, unemployment among dentists is virtually non-existent.

The demand for dental services will be positively influenced by a number of factors in the years to come. Among these are improved dental health, allowing more people to keep their teeth longer; expanding coverage under dental insurance plans; an aging population requiring restorative dentistry; and improved public awareness of dental health maintenance. However, improved decay preventative measures and the increasing use of dental hygienists are expected to negatively affect the employment growth potential for dentists. Currently, the market for dentists is full throughout B.C. According to the Canadian Dental Association, additions to employment of dentists would represent a surplus situation, since a growing number of dentists will actually be sharing a total workload that is expected to change very little over the next eight years. More women have chosen this profession over the last several years, with their representation increasing from 3% to 9% between 1971 and 1986. The incidence of part-time work is below average, when compared to all other occupations.

Earnings

The average annual employment income of all B.C. dentists was approximately $71,800 in 1986. Those employed full-time, full-year averaged $74,100.

Related Occupations

Optometrists, Physicians and Podiatrists.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,790	1,960	2,320

Annual Growth 1987-1995: 2.1%

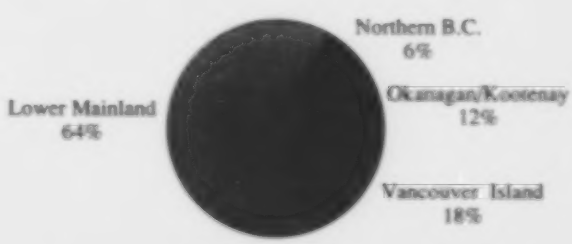
Main Industries of Employment 1986 Census

Dentists' Offices	98%
Government	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
360	310	670

Employment by Region



▶ Veterinarians 3115

Nature of the Work

Veterinarians in urban areas prevent, diagnose and treat disease in small animals, mainly dogs and cats, whereas veterinarians in farming and rural communities deal primarily with agricultural animals. Rural practices have become more sophisticated in the past few decades to meet the changing needs of large farm operations. Most veterinarians are employed in private practice and group practices are becoming increasingly common in response to escalating start-up and operating costs. Veterinarians may also specialize in the care of horses; the fields of education and medical research; or work in zoos or wildlife preserves.

Because they are self-employed, veterinarians in private practice usually can continue working beyond normal retirement age.

Education and Skills

A career in veterinary science begins with a Doctor of Veterinary Medicine (D.V.M.) degree, the minimum requirement for the compulsory registration and licensure with the B.C. Veterinary Medical Association. Available at four universities in Canada, this four year program is offered by the Western College of Veterinary Medicine at the University of Saskatchewan, Saskatoon, which serves the four western provinces. Admission requirements include two years of pre-veterinary studies at the university level (three years is usual due to the number of qualified applicants), with an emphasis on the biological sciences, chemistry and physics. Students are advised to follow a program of study that satisfies the requirements for the bachelor of science in agriculture degree as well as pre-veterinary requirements. Experience in part-time or summer jobs working with animals is advantageous.

A two year program in pre-veterinary medicine leading to the four year program at Western College is available at UBC through the faculty of agricultural sciences. Cariboo College offers the first year of pre-veterinary medicine and university transferable science programs are available at SFU, UVic and other community colleges.

Continuing education and training are important in the practicing veterinarian's professional career. Postgraduate studies may be required for employment in veterinary research and education.

B.C. Job Prospects

Job growth in this occupation was above average between 1981 and 1987, and projections to 1995 call for jobs to continue to grow faster than the average for all other occupations. Growth is expected to result from the increase in companion animals (dogs and cats) and the emphasis on scientific methods of raising livestock. However, this is a small job group in B.C. with the number employed in 1995 expected to be less than 500. This includes an estimated 80 new job openings and 40 replacement opportunities expected over the projection period.

As with any profession in which self-employment predominates, unemployment among veterinarians is very low. In B.C., veterinarians are employed in veterinary services, the federal government and in teaching/research institutions. Employment tends to remain stable throughout the year, fluctuating only marginally with the seasons. Part-time employment is not common among veterinarians (over 80% work full-time, full-year). At the time of the 1986 census, three of every ten veterinarians were women, triple the number of 1981.

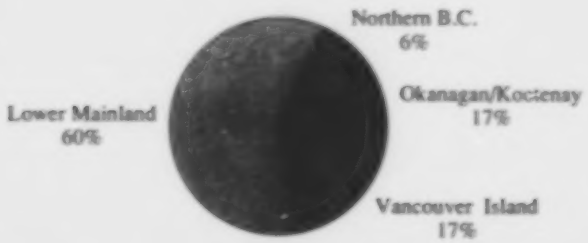
Earnings

Veterinarians in B.C. who worked full-time, full-year earned $30,800 in 1986. Salary ranges for veterinarians with the federal government begin at $34,300 and go up to $64,300.

Related Occupations

Podiatrists, Chiropractors and Physicians.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	260	400	480

Annual Growth 1987-1995: 2.2%

Main Industries of Employment 1986 Census

Veterinary Services	95%
Federal Government	2%
Education	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
80	40	120

3131 Nurses: Registered, Graduate and Nurses-in-Training

Nature of the Work

Nurses (RNs) care for patients' physical, mental and emotional needs. Where a nurse works determines the scope of the responsibilities. Those who work in hospitals usually work with patients who require nursing care in such specialty areas as intensive care, operating room, paediatrics, psychiatry, geriatrics or cardiovascular nursing. Public Health nurses provide home health care and participate in various community health-education campaigns. Private duty nurses provide care on an independent contract basis, usually to one patient in a hospital or private home. The government nursing services in such areas as the foreign service or the Canadian Armed Forces also offer employment for registered nurses. Staff nurses in hospitals and nursing homes can expect to work nights, weekends and holidays.

Education and Skills

BCIT and colleges throughout B.C. offer two year RN diploma programs, as well as refresher and upgrading courses. UBC offers a four year Bachelor of Science in Nursing (B.S.N.) program, and both UBC and UVic have two year programs that allow RNs to obtain a B.S.N. degree. Graduates of these programs are eligible to write the compulsory registration exams to practice in B.C. The Registered Nursing Association of B.C. recommends that by the year 2000 the bachelor of science degree be the minimum requirement for RNs. As of September 1989, students entering the Vancouver General Hospital school of nursing will be enrolled as UBC students. They will be required to meet the university's admission standards, take the same four year program and will graduate with a Bachelor of Science degree in nursing. A master's degree is needed for administrative or management positions.

Entrance requirements for these programs include high school graduation with a strong sciences and algebra background. Previous paid or volunteer experience in health care is recommended. Students are advised to apply well in advance because enrollment is limited. Nurses must be in good health and have physical stamina. This is a high stress occupation requiring emotional stability to cope with human suffering and frequent emergencies.

B.C. Job Prospects

Although job growth in this occupation was above average between 1981 and 1987, projections to 1995 call for jobs to grow about as fast as the average for all other occupations. However, this is a very large job group in B.C. with the number employed in 1995 expected to be almost 31,000. This includes an estimated 4,170 new job openings and 5,150 replacement opportunities expected over the projection period. Other factors positively affecting growth include the aging population, the increase in RN staffing in acute care hospitals (rather than mixed with Licensed Practical Nurses) and the expanding role of nurses in community based health care delivery. As in many of the health care professions, changes in employment are ultimately dependent on government expenditures in the health sector.

In B.C., nurses are primarily employed in hospitals, other health care services and in government. In 1987 unemployment among nurses was very low. Currently, difficult-to-fill vacancies in nursing are in intensive care; general duty RN; extended care, and paediatric nursing. Women predominate in this profession (95%), and the rate of part-time employment among nurses is almost double that for the labour force in general.

Earnings

The average annual employment income of B.C. nurses was approximately $19,100 in 1986. Only 42% were employed full-time, full-year, and these workers' earnings averaged $25,900.

Current (1989) non-union, hourly wages for RNs range from $9.50-$15.00. Union wages range from $14.31-$16.92 per hour.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	18,460	26,650	30,810
Annual Growth 1987-1995:		1.8%	

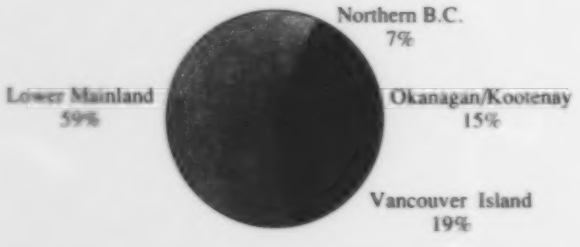
Main Industries of Employment 1986 Census

Hospitals	85%
Other Health Services	7%
Government	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
4,170	5,150	9,320

Employment by Region



Licensed Practical Nurses (LPNs) 3134
Nursing Attendants 3135

Nature of the Work

Nursing attendants, also known as long term care aides, orderlies, nurses' aides, geriatric aides, and health care workers care for patients in nursing homes, extended care facilities, mental health facilities, rehabilitation centres and some hospital divisions. Typical duties include feeding patients who are unable to feed themselves, making beds, bathing and dressing patients, and transporting patients by wheelchair or stretcher.

Licensed Practical Nurses (LPNs) carry out similar duties, but also have extended responsibilities assigned by a physician or registered nurse. While LPNs provide nursing care that requires technical knowledge, this occupation does not require the professional education and training of a registered nurse. LPNs assist with the specified treatment of patients such as taking blood pressure, giving oral medications as directed and changing dressings.

Work in these occupations involves many hours of standing and helping patients move in bed, stand or walk. Hospital schedules include shift work, which involves night, weekend and holiday work. A closely related field is the Home Support Worker (see profile SOC 2333).

Education and Skills

Long Term Care Aide/Home Support Worker (nursing attendant) programs are offered by community colleges throughout B.C. All last between 15-16 weeks and require at least Grade 10 or the equivalent.

Practical Nurse (LPN) training programs are offered by several community colleges. The program lasts about ten months and prepares students to seek B.C. licensure and employment as licensed practical nurses. Grade 12 is usually required, with Biology 11 and 12 preferred.

These occupations require physical stamina and workers should be patient, understanding, emotionally stable and dependable. They should be able to work as part of a team and be willing to perform repetitive, routine tasks.

B.C. Job Prospects

Although job growth in both these occupations was below average between 1981 and 1987, projections to 1995 call for employment to grow about as quickly as the average for all other occupations.

Nursing attendants represent a large job group in B.C. with the number employed in 1995 expected to be over 9,700. This includes an estimated 1,310 new job openings and 2,010 replacement opportunities expected over the projection period. In 1987, unemployment among nursing attendants was higher than in past years and above average compared to the labour force as a whole.

LPNs also represent a fairly large occupation in B.C. with the number employed in 1995 expected to be over 2,270. This includes an estimated 310 new job openings and 310 replacement opportunities expected over the next 7 years. Factors that could negatively impact LPN job growth include technology, which continues to make standard nursing care more complex, and the current practice of B.C. hospitals to decrease their dependence on LPNs in favour of more registered nurse positions. The latter is reflected in the current high unemployment among LPNs, which is well above the average for all occupations.

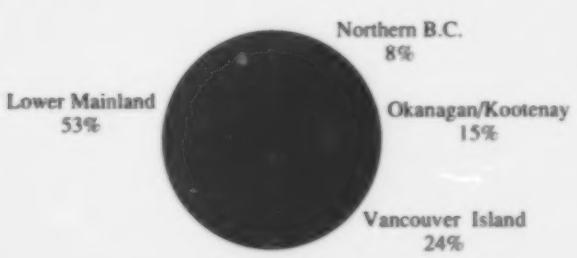
Cutbacks in B.C. hospitals will continue to affect unemployment among both nursing attendants and LPNs, but the increasing need for geriatric care in our aging population will increase demand long-term. In 1986 over 80% of all these jobs were filled by women, a slight increase from 1981. A high proportion of this occupational group are employed part-time.

Earnings

In 1986, the average annual employment income of LPNs who worked full-time, full-year was approximately $20,200 and $20,300 for nursing attendants.

Current (1989) non-union wages for LPNs range from $6.00-$11.00 per hour, with the union rates at $11.30-$13.60 per hour. The respective figures for nursing attendants are $4.50-$9.00 and $9.40-$11.00 per hour.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	11,710	10,430	12,050

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Hospitals	93%
Manufacturing	5%
Other Health Care	2%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,620	2,320	3,940

3136 Audio and Speech Therapists

Nature of the Work

Therapists use a variety of techniques to help patients who are injured, physically or mentally disabled, or emotionally disturbed. Speech therapists assess and treat communication disorders, including disorders from hearing loss, brain injury, foreign dialect or learning disabilities. Audiologists assess and treat hearing problems, sometimes by fitting hearing aids or providing lip-reading instruction. But because speech and hearing are so interrelated, a therapist in either of these specializations must be familiar with both audio and speech therapy.

Although audio and speech therapy is not physically demanding, the close attention to detail and intense concentration needed can be mentally exhausting.

Education and Skills

UBC's School of Audiology and Speech Sciences offers a two year, full-time graduate program leading to a Master of Science (M.Sc.) degree. During the first year all students follow the core-curriculum; in the second year, students choose either audiology or speech language pathology as their major. Admission requirements include an undergraduate degree in linguistics (UBC or UVic graduates should have completed the Speech Science major in linguistics) and prerequisite science and psychology courses. Licensing is not compulsory in B.C., although some employers insist that employees be eligible for membership in the B.C. Speech and Hearing Association, Vancouver.

All therapists must have patience, tact, resourcefulness and emotional stability to help patients and their families understand treatment and adjust to handicaps.

B.C. Job Prospects

Although job growth in this occupation was about average between 1981 and 1987, projections to 1995 call for jobs to grow more slowly than the average for all other occupations. In addition, this is a small occupation in B.C. with the number employed in 1995 expected to be about 380. This includes an estimated 50 new job openings and 50 replacement opportunities expected over the projection period. In 1987 unemployment was very low and below average, and there is currently a shortage of audio and speech therapists in B.C., especially outside the Vancouver area.

Contributing to job opportunities in this field is the early screening of preschool and school age children for speech, language or auditory disorders; the integration of handicapped children into the regular school system; and the development of new programs for hearing or speech impaired adult/senior populations. However, government spending in the health care and education sectors is expected to be more limited and this will act against strong employment growth. In B.C., most audio and speech therapists are employed in schools, hospitals and other health care services. Women held over 90% of these jobs in 1986, and only one in three people worked full-time, full-year.

Earnings

The average annual employment income of all B.C. workers in this group was approximately $21,800 in 1986. Only 34% were employed full-time, full-year, and these workers' earnings averaged $29,900.

Current (1989) union wages for speech-language pathologists and audiologists range from $2,290-$3,350 per month.

Related Occupations

Prosthetists, Chiropractors and Orthotists.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	330	340	380

Annual Growth 1987-1995: 1.5%

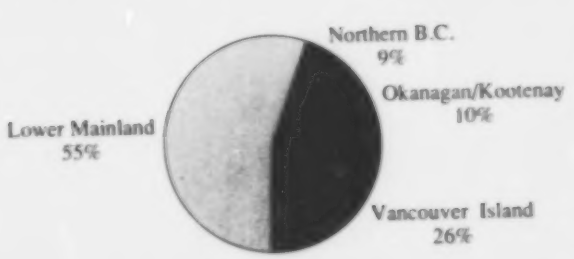
Main Industries of Employment 1986 Census

Education	34%
Hospitals	26%
Other Health Care	17%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
50	50	100

Employment by Region



Nature of the Work

Physiotherapists use exercise and other treatments to help patients increase strength, mobility and coordination. Their patients include accident victims, handicapped children and stroke victims. The goal is to help patients attain maximum functional independence, muscle strength and physical skills to adapt to what may be a drastic change in physical abilities.

Massage therapists use massage, hydrotherapy and other soft tissue therapies to treat physical disorders. Evening and weekend hours may be required.

Physiotherapy can be physically demanding because these therapists are on their feet most of the time.

Education and Skills

UBC's School of Rehabilitation Medicine offers a Bachelor of Science program in Physical Therapy. Entrance into this three year program requires completion of an approved first year science program, and students are advised that many more apply than are accepted. Graduates are eligible to write national and provincial associations' licensing exams, both of which are required for employment.

Massage therapy is available through a two year program at the West Coast College of Massage Therapy in Vancouver. Admission requirements include high school graduation with Biology 12 and one other science 12. Graduates are eligible to write the provincial licensing exam. Massage therapists work mainly in clinics, but they also find work in health clubs or in hotels and cruise ships.

All therapists must have patience, tact, resourcefulness and emotional stability to help patients and their families understand the treatments and adjust to handicaps. Physiotherapists should also have manual dexterity and physical stamina.

B.C. Job Prospects

Job growth in this occupational group was well above the average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow faster than the average for all other occupations. This is a medium size job group in B.C. with the number employed in 1995 expected to be about 1,800. This includes an estimated 250 new job openings and 280 replacement opportunities expected over the projection period. In 1987 unemployment was much lower than the average for all occupations, and currently there are widespread and chronic shortages of physiotherapists in B.C., as well as in much of Canada.

Contributing to job opportunities is our aging population and advances in medical technology which continue to save the lives of patients who only a few years ago would have died. Government spending in the health care and education sectors is expected to be more limited and this will act against strong employment growth. Hospitals are the largest employer of physiotherapists in B.C. Even though hospitals now provide their services on a more intensive basis and patients therefore are hospitalized for shorter periods, many hospitals, especially in smaller communities, provide physiotherapy on an out-patient or day clinic basis. In larger communities, private physiotherapy facilities are more common. Thirty percent of physiotherapists in B.C. are in private practice and part-time work in physiotherapy is twice as high as the average for all other occupations. Women predominate in this occupation with a representation of 86% in 1986.

Earnings

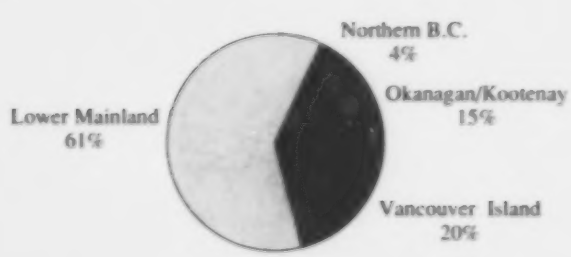
The average annual employment income of all B.C. physiotherapists was approximately $22,000 in 1986. Only 41% were employed full-time, full-year, and these workers' earnings averaged $29,000.

Current (1989) non-union wages for physiotherapists range from $1,900-$3,000 per month. Union wages range from $2,040-$2,690 per month.

Related Occupations

Prosthetists, Chiropractors and Orthotists.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,200	1,540	1,790

Annual Growth 1987-1995: 1.9%

Main Industries of Employment 1986 Census

Hospitals	50%
Other Health Care	44%
Provincial Government	4%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
250	280	530

Nature of the Work

Occupational therapists use a variety of techniques to help patients who are injured, physically or mentally disabled, or emotionally disturbed. While physical therapists (see profile SOC 3137) use physical treatment to rehabilitate injured or disabled patients, the treatment programs used by occupational therapists are based on activities such as work, education and recreation. Occupational therapists teach skills of everyday living, including vocational skills. Their goal is to help patients adapt to their limitations and learn to be as self-sufficient as possible. In a mental health setting they may treat those with alcoholism, drug abuse or stress-related disorders by providing functional as well as cognitive and social skills to develop a healthier lifestyle. The main work setting for these occupations is a hospital, however, practice in the patient's home, or community clinics is becoming more common. Occupational therapy can be physically demanding because these therapists are on their feet most of the time. They must also move equipment and help patients turn, stand or walk.

Education and Skills

UBC's School of Rehabilitation Medicine offers a Bachelor of Science program in Occupational Therapy. Entrance into this three year program requires completion of an approved first year science program. Graduates are eligible to write national and provincial associations' licensing exams, both of which are required for employment. All therapists must have patience, tact, resourcefulness and emotional stability to help patients and their families understand the treatments and adjust to handicaps. Occupational therapists should also have manual dexterity and physical stamina.

B.C. Job Prospects

Although job growth in this occupation was well above the average between 1981 and 1987, projections to 1995 call for jobs to grow about as fast as the average for all other occupations. This is a small job group in B.C. with the number employed in 1995 expected to be about 700. This includes an estimated 90 new job openings and 110 replacement opportunities expected over the projection period. Factors contributing to job opportunities are the expanding older population and advances in medical technology which continue to save the lives of patients who only a few years ago would have died. Government spending in the health care and education sectors is expected to be more limited and this will act against strong employment growth.

In 1987 unemployment was much lower than the average for all occupations, and there are currently shortages of occupational therapists in B.C. Because their services are not covered/included in the provincial fee-for-service reimbursement program, only 3% of occupational therapists are self-employed in B.C. Most work in hospitals, other health care services and in the provincial government. As hospitals now provide their services on a more intensive basis and patients therefore are hospitalized for shorter periods, hospitals are less likely to provide new job opportunities for occupational therapists. Demand is more likely to be in nursing homes and home health care agencies. The frequency of part-time work in occupational therapy is almost three times as high as the average for all other occupations. Women predominate in this occupation, with a representation of 86% in 1986.

Earnings

The average annual employment income of occupational therapists in B.C. was approximately $17,500 in 1986. Only 41% were employed full-time, full-year, and these workers' incomes averaged $23,500.

Related Occupations

Prosthetists, Chiropractors and Orthotists.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	460	600	690

Annual Growth 1987-1995: 1.8%

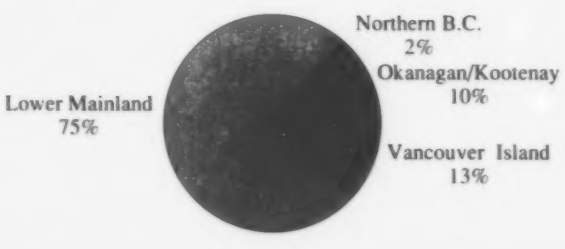
Main Industries of Employment 1986 Census

Hospitals	77%
Other Health Care	14%
Provincial Government	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
90	110	200

Employment by Region



Nature of the Work

Pharmacists dispense drugs and medicines prescribed by physicians, podiatrists and dentists. Since most medicines are now produced by manufacturers in the dose and form used by patients, the actual mixing of ingredients to form tablets, solutions and ointments is now only a small but important part of a pharmacist's practice. Pharmacists must understand the use, composition and effect of drugs and how they are tested for purity and strength. Pharmacists give advice to customers on appropriate home and over-the-counter remedies, check prescriptions for overdoses and drug interactions and keep records of dispensed drugs and prescriptions. Pharmacists in hospitals also work as consultants to the medical team on drug therapy. Pharmaceutical training and practice can lead to related careers in research, education, sales and administration. Pharmacists spend a lot of time on their feet and pharmacies usually have extended hours, so evening, weekend and holiday work is common. Pharmacists also often act as managers of drug stores.

Education and Skills

UBC offers a four year Bachelor of Science Degree in Pharmacy (B.Sc.Pharm.). Admission requirements include completion of one year of a university sciences program. Students are advised that the number of qualified applicants far exceeds the number of places available in the program. Graduate and residency programs as well as continuing education courses are also available. Pharmacists must be licensed and registered to practice in B.C. Pharmacists who own or manage a pharmacy must have business sense and the ability to gain the confidence of clients.

B.C. Job Prospects

Job growth in this occupation was well above average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow much faster than the average for all other occupations. This is a fairly large job group in B.C. with the number employed in 1995 expected to be almost 2,400. This includes an estimated 400 new job openings and 490 replacement opportunities expected over the projection period. Unemployment rates for 1987 were much lower than the average for all occupations, resulting primarily from the high number of self-employed practitioners. Most pharmacists in B.C. work in either chain or independent retail pharmacies or hospital pharmacies.

Employment demand is moderately affected by economic conditions. The role of the pharmacist in hospitals is expanding, a trend which could increase the demand for these professionals. On the other hand, increased employment of pharmacy dispensary assistants could have a negative effect on employment for pharmacists. Our expanding older population will contribute to growth in this occupation.

The percentage of pharmacists working part-time is double the average for all other occupations. More and more women have chosen this profession over the last several years, with their representation nearly doubling from 23% to 44% between 1971 and 1986.

Earnings

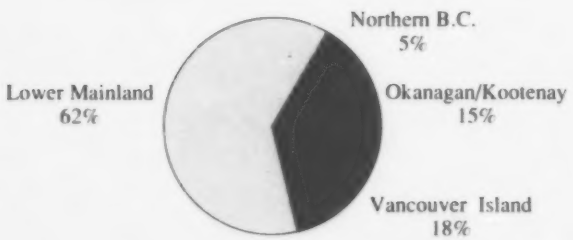
The average annual employment income of pharmacists in B.C. was approximately $27,900 in 1986. Sixty-one percent were employed full-time, full-year, and these workers' incomes averaged $34,400.

Current (1989) non-union wages for pharmacists range from $10.50-$18.60 per hour. Union wages range from $17.70-$20.90 per hour.

Related Occupations

Pharmacologists, Pharmaceutical Scientists and Marketing and Sales Representatives.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,450	1,980	2,380

Annual Growth 1987-1995: 2.3%

Main Industries of Employment 1986 Census

Retail Trade	82%
Hospitals	17%
Education	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
400	490	890

Nature of the Work

Nutrition is the science of food and its effect on the body. Dietitians and nutritionists are concerned with the relationship between diet and health. Nutritionists analyze and conduct nutrition programs to control disease and promote good health. Dietitians plan and supervise food service programs in hospitals, schools, restaurants and other establishments to ensure proper nutrition. An increasing number of dietitians are self-employed consultants. Others are employed in the education, government and manufacturing sectors.

Education and Skills

UBC's School of Family and Nutritional Sciences offers four year degree programs in Dietetics and Nutritional Sciences. The Bachelor of Science in Nutritional Sciences is specifically intended for those interested in graduate study and research in nutrition and for those interested in agriculture or the health sciences in which a background in nutrition would be helpful. UBC also offers master's and doctoral programs in Nutritional Sciences.

The Bachelor of Science in Dietetics is designed to provide preparation for students interested in pursuing careers as professional dietitians. Graduates may apply for a one year internship, in order to qualify for membership in the national and provincial dietetic associations. Admission requirements include a strong high school background in math and sciences. Other students with a bachelor's degree in science, food science or home economics may take additional courses in the School of Family and Nutritional Sciences and then also apply for the internship program.

Those interested in becoming dietitians or nutritionists should have organizational and administrative ability as well as scientific aptitude, and should be able to work well with people. As hospital settings become increasingly computerized, computer skills are becoming required.

B.C. Job Prospects

Although job growth in this occupation was well above average between 1981and 1987, projections to 1995 call for jobs to grow about as fast as the average for all other occupations. This is a small job group in B.C. with the number employed in 1995 expected to be about 610. This includes an estimated 80 new job openings and 100 replacement opportunities expected over the projection period. Changes currently taking place in the area of health care administration could affect overall demand as more hospitals are centralizing their food supply. An emphasis on outpatient, ambulatory patient care is increasing the need for dietitians and nutritionists trained to work in public health.

In 1987 unemployment among dietitians was much lower than average, suggesting that current labour market conditions are more favourable than for most occupations. Most dietitians and nutritionists in B.C. are employed in hospitals, the government and the accommodation and food service industry.

Part-time employment is common in this field, with a rate three times that of other occupations. In 1986, 95% of dietitians and nutritionists were women, a level virtually unchanged from 1981.

Earnings

The average annual employment income of these B.C. workers was approximately $19,500 in 1986. Only 43% were employed full-time, full-year, and their incomes averaged $28,700.

Related Occupations

Food and Home Economists, Food Service Managers and Executive Chefs.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	380	530	610

Annual Growth 1987-1995: 1.7%

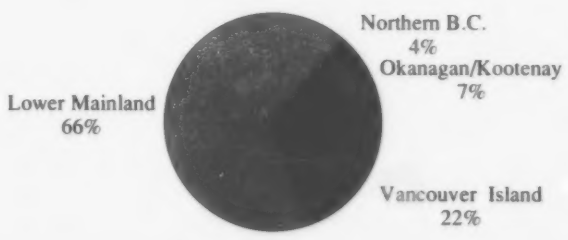
Main Industries of Employment 1986 Census

Hospitals	77%
Government	7%
Accommodation & Food Services	4%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
80	100	180

Employment by Region



Dispensing Opticians 3154

Nature of the Work
Dispensing opticians fit eyeglasses and contact lenses according to the prescription of an ophthalmologist or optometrist. They help customers choose an appropriate frame; order the necessary corrective lenses from an optical laboratory; and after the glasses are made check the power and surface quality of the lenses and adjust the frame to the contours of the customer's face and head. Fitting contact lenses requires more skill and care. The optician measures the cornea and then prepares specifications for the contact lens manufacturer which include the doctor's prescription. During the initial adjustment period of several weeks, the optician instructs the customer in the proper techniques of lens usage and care and also monitors the patient's corneas with special instruments. Dispensing opticians are usually employed in retail shops. In recent years, there has been a trend toward the franchising of optical services.

Education and Skills
There are two methods of training to become a dispensing optician. The first requires completion of a two year program at a school of optical dispensing plus one year of practical training. These programs are not available in B.C. and are only offered in Ontario and Quebec. The second method requires three years of on-the-job training under a qualified worker, supplemented by a two year program of part-time studies in optical dispensing. A home study program is offered by the Canadian Guild of Dispensing Opticians. A certificate is issued by the Guild, but registration, certification and licensing are not compulsory in B.C.

Employers considering applicants for entry-level jobs usually look for high school graduates with a background in math. Because this is a public contact job, good communications skills and tact are necessary.

B.C. Job Prospects
Job growth in this occupation was above average between 1981 and 1987 and projections to 1995 call for jobs to grow much faster than the average for all other occupations. However, this is a small job group in B.C. with the number employed in 1995 expected to be about 780. This includes an estimated 270 job openings over the projection period, with about half of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. Unemployment in 1987 was much lower than average, suggesting that current labour market conditions for dispensing opticians are more favourable than for most occupations.

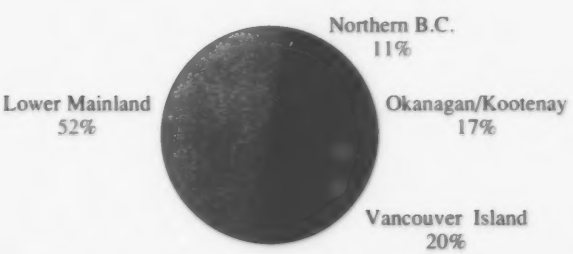
Relative to the labour force as a whole, employment in this field is only moderately susceptible to economic conditions. Factors which could influence demand growth, however, include service coverage under private insurance plans and optometrist and ophthalmologist involvement in eyeglass and contact lens dispensing. Positive influences are the aging population, expanded testing of children, and a trend toward the purchase of more than one pair of corrective lenses.

The main industries of employment for dispensing opticians in B.C. are retail trade, health care services and ophthalmic goods manufacturing. Employment in these occupations is independent of seasonal forces and in 1986, opportunities for part-time employment were about average, when compared to all other occupations. At the time of the 1986 census, 48% of dispensing opticians were women, over three times the proportion of 1971.

Earnings
The average annual employment income of dispensing opticians in B.C. was approximately $17,800 in 1986. Fifty-six percent were employed full-time, full-year, and these workers' incomes averaged $23,500.

Related Occupations
Dental Laboratory Technicians, Biomedical Equipment Technicians and Manufacturers' Sales Representatives.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	540	650	780

Annual Growth 1987-1995: 2.3%

Main Industries of Employment 1986 Census

Retail Trade	65%
Health Care Services	25%
Ophthalmic Goods Manufacturing	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
130	140	270

3155 Radiological Technologists and Technicians

Nature of the Work

Specialties in this field include nuclear medicine, diagnostic radiology (X- ray) and radiation therapy technology. The information gathered by these radiological technologists is used by physicians in the diagnosis and treatment of disease.

Nuclear medicine technologists calculate and prepare the correct dosages of radioactive materials given to patients by mouth, injection, or other means and then position the patient for the imaging procedures.

In diagnostic radiology, radiographers take X-ray films (radiographs) of all parts of the human body. They may also perform activities of assistance to radiologists (physicians who specialize in the interpretation of radiographs) such as preparing drugs and chemical mixtures.

Radiation therapy technologists treat cancer patients. They prepare patients for radiotherapy and administer prescribed doses of ionizing radiation to diseased body areas.

Education and Skills

BCIT offers a two year program in Nuclear Medicine Technology. Admission requirements include Algebra 12, Chemistry 11 and 12, and preferably Physics 11. After one year of clinical experience, students are eligible to write national certification examinations resulting in the designation Registered Technologist (Nuclear Medicine).

BCIT offers a 25 month program in Medical Radiography (X-ray technologist), which prepares students to write the national certification exam. The final 12 months of the program consist of a clinical training period at one of the participating hospitals. Admission requirements include a strong background in high school math and sciences. Basic typing skills, an introductory computer course and some type of volunteer work are considered assets for selection.

The Cancer Control Clinic of B.C. in Vancouver offers a 27 month program in Radiology Therapy Technology. Only four students are accepted each year.

B.C. Job Prospects

Job growth in this occupational group was well above average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow faster than the average for all other occupations. This is a medium size job group in B.C. with the number employed in 1995 expected to be about 1,340. This includes an estimated 190 new job openings and 160 replacement opportunities expected over the projection period. In 1987 unemployment was lower than average, suggesting that current labour market conditions for radiological technicians and technologists are more favourable than for most occupations. Most are employed in hospitals and other health care services.

Although current projections suggest strong employment growth in this field, actual rates of change will be affected by the dual impact of technology in this field. On the one hand, the trend in hospitals toward use of mobile technical equipment and personnel in an effort to share expensive services could limit employment demand. On the other hand, technological innovation could enhance demand by increasing the level of specialization required in this field. As in other health-related occupations, the aging population should increase employment for medical radiological technologists, but government policy to control health care costs may hold growth back.

Thirteen percent of these workers are employed on a permanent part-time basis, which is almost double the rate for all other occupations. In 1986, 90% of radiological technicians were women, a moderate increase over the 1981 figure.

Earnings

The average annual employment income of these B.C. technologists and technicians was approximately $19,600 in 1986. Forty-eight percent were employed full-time, full-year, and these workers' incomes averaged $26,100.

Current (1989) non-union wages for these workers range from $1,500-$2,500 per month. Union wages range from $1,600-$3,300 per month.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	850	1,150	1,340

Annual Growth 1987-1995: 1.9%

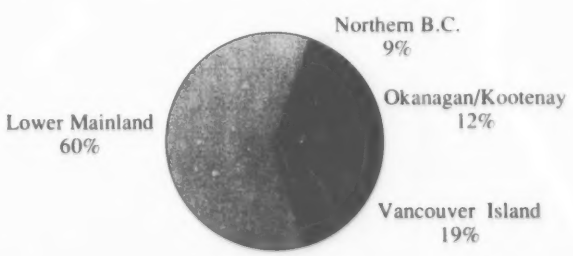
Main Industries of Employment 1986 Census

Hospitals	74%
Other Health Care	26%
Air Transportation	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
190	160	350

Employment by Region



Medical Laboratory Technologists and Technicians 3156

Nature of the Work
This category includes biochemical, microbiological, cytogenetic (analysis of human body cells), cancer research and pharmacy technologists. Medical laboratory technologists and technicians (MLTs) perform tests ordered by physicians to help identify health problems and illnesses. They prepare tissues for microscopic examination by a pathologist; perform blood counts for evidence of anemia or infection; type blood for transfusions; and prepare vaccines. Medical laboratory technologists work in hospitals, clinics, laboratories, pharmaceutical firms and research institutions. They may spend a lot of time on their feet and because hospital labs are open round the clock, workers there may work evenings, nights, weekends, and holidays.

Education and Skills
BCIT and Cariboo College offer a program in Medical Laboratory Technology which prepares students to write the national certification exams. This designation of Registered Technologist (RT) is compulsory and allows the student to work in any province, except Quebec. The two year program consists of one year of academic studies followed by a 12 month training period in a clinical facility. Admission requirements include successful completion of first-year university level Biology, Chemistry, Physics, English and Math. BCIT also offers a two year program in Biomedical Engineering Technology (the safe and correct performance of equipment used in medicine and biology).

Advanced degree holders may attain senior, supervisor or research positions. UBC offers a two year Bachelor of Medical Laboratory Science (B.M.L.Sc.) degree program which prepares RTs for the Advanced Registered Technologist (ART) designation. BCIT offers a 14 month program in Cytogenetics Laboratory Technology, which is the investigation of chromosomes to diagnose clinical disorders such as Down's syndrome, sterility/infertility and prenatal disorders. Admission requirements include a Bachelor of Science in Cell Biology or current RT designation with relevant work experience.

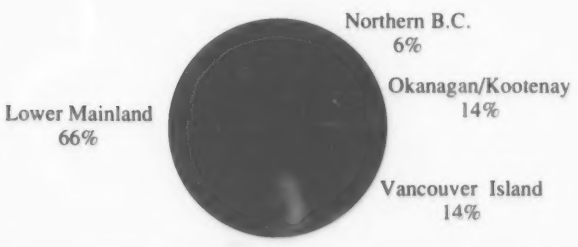
Manual dexterity, normal colour vision and the ability to work under pressure are important personal characteristics. Attention to detail, accuracy and precision is crucial in this work. With increased automation, mechanical and electronic skills are increasingly valued.

B.C. Job Prospects
Job growth in this occupation was well above average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow faster than the average for all other occupations. This is a large job group in B.C. with the number employed in 1995 expected to be over 5,100. This includes an estimated 720 new job openings and 690 replacement opportunities expected over the projection period. In 1987 unemployment was much lower than the average, suggesting that current labour market conditions are more favourable than for most occupations. Most medical laboratory technologists and technicians in B.C. are employed in hospitals, other health care services and research institutions.

Demand growth in this field will depend to a great extent on government policy and the financial resources available to the health care system. Nevertheless, volume will continue to grow with an expanding older population. The availability and increased use of portable laboratory analytical instruments, combined with the increase of shared laboratory services, could slow employment in this field. The demand for technologists with a RT in cytogenetics lab technology is expected to increase as a result of an increased demand for prenatal cytogenetic testing. Women predominate in this occupational group (81%) and opportunities for part-time work are greater than in the labour market at large.

Earnings
The average annual employment income of this job group in B.C. was approximately $21,700 in 1986. Fifty-three percent were employed full-time, full-year, and these workers' incomes averaged $28,000.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,500	4,390	5,100

Annual Growth 1987-1995: 1.9%

Main Industries of Employment 1986 Census

Hospitals	55%
Other Health Care	31%
Education	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
720	690	1,410

3157
3161

Denturists
Dental Laboratory Technicians

Nature of the Work

On the prescription of a dentist, dental technicians alter, repair and make artificial devices such as removable dentures, bridgework, crowns and orthodontic appliances. Dental mechanics (also called denturists) do similar work, but their activities also include the fitting of patients for dentures in the absence of a prescription. Dental technicians work in typical laboratory surroundings. Where many power tools are operating, noise levels may be high. The work is not strenuous and salaried technicians usually work forty hours a week, although self-employed technicians frequently work longer hours.

Education and Skills

Apprenticeship programs for both dental technicians and mechanics are being phased out in B.C. Entry-level training programs in both areas are offered at Vancouver Vocational Institute (VVI). These two year programs require Grade 12 or the equivalent, with Biology 12 and Chemistry or Physics 11. The Dental Technicians' and Denturists' Board of B.C. requires graduates of the programs to complete a one year internship before being allowed to write the provincial licensing exam.

Skills important in this field are a high degree of finger dexterity, good vision and the ability to recognize very fine colour shadings. Also important is the ability to follow instructions and an inclination for absolutely accurate work.

B.C. Job Prospects

Although job growth for both these occupations was below average between 1981 and 1987, projections to 1995 call for jobs to grow faster than the average for all other occupations. However, denturists and dental lab technicians are small job groups in B.C. with the number employed in 1995 expected to total about 810. This includes an estimated 40 job openings for denturists and 230 for dental technicians expected over the projection period, including those jobs resulting from attrition.

The factors which positively influence the demand for dentists (an increasing emphasis on preventive dental maintenance and the ability of more people to keep their teeth longer) may have a negative impact on the demand for denturists and dental technicians; however, an aging population suggests that there will be employment growth in the restorative fields as well. Shortages for dental technicians do occur, generally in Northern B.C. Most denturists and dental technicians work in dental laboratories, and the opportunity for part-time work is about average, when compared to all other occupations.

Earnings

In 1986, the average annual employment income of denturists was approximately $20,400 and $21,600 for dental technicians. About 60% of those working in both these fields were employed on a full-time, full-year basis and these workers had an average income of about $24,600.

Related Occupations

Orthotics Technicians and Opticians.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	880	680	810

Annual Growth 1987-1995: 2.2%

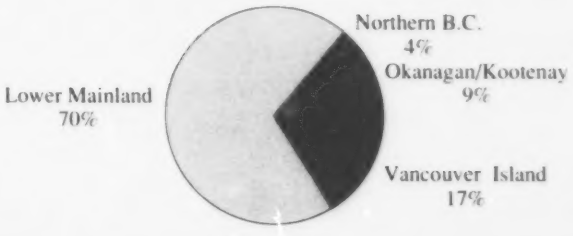
Main Industries of Employment 1986 Census

Dental Laboratories	84%
Health Care Services	16%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
130	140	270

Employment by Region



Dental Hygienists and Dental Assistants 3158

Nature of the Work
Dental hygienists clean and polish teeth, take X-rays and impressions, instruct patients in proper dental care techniques and perform other preventive and treatment services. Dental assistants prepare the patient for treatment, sterilizing instruments, assisting the dentist at the chairside, processing X-rays, preparing solutions and fillings for treatment, and very often, assuming day-to-day clerical responsibilities. Dental hygienists and assistants usually work in clean, well-lighted offices. Many work part-time and some of this work may be on Saturdays or during evening hours. Some dental assistants become sales representatives for firms that manufacture dental products.

Education and Skills
There is a two year diploma program in Dental Hygiene offered at Vancouver Vocational Institute (VVI) and the College of New Caledonia. Entrance requirements include completion of a first year college or university level science program including biology, chemistry, psychology and English. A one year Dental Assistant program is offered at numerous B.C. colleges. Prerequisites include Grade 12 graduation with some science courses, a CPR and first aid certificate. There is also a correspondence program through the Open Learning Agency for those currently employed as dental auxiliaries.

People who want to become dental hygienists and assistants should enjoy working with others and be able to deal with people who may be under stress. Personal neatness, cleanliness and good health are also important qualities. Dental hygienists must have manual dexterity because they use various dental instruments with little room for error.

B.C. Job Prospects
Job growth for these occupations was above average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow faster than the average for all other occupations. Dental hygienists and assistants are a fairly large occupational group in B.C. with the number employed in 1995 expected to be about 4,400. This includes an estimated 680 new job openings and 650 replacement opportunities expected over the projection period. Unemployment for these occupations in 1987 was about average, but this mainly reflects the unemployment situation for uncertified dental assistants. Qualified dental hygienists are in short supply with frequent shortages in various centres in B.C.

The factors which positively influence the demand for dental hygienists and assistants include expanding dental insurance coverage, an increasing emphasis on preventive dental maintenance and more people keeping their teeth longer.

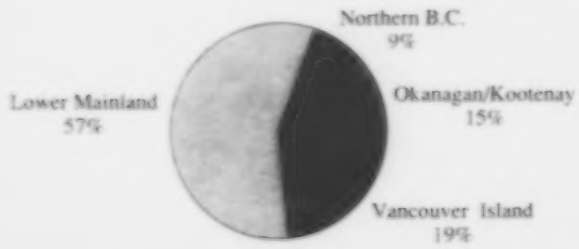
Women predominate in dental hygienist and assistant jobs (97%), and opportunities for part-time work are greater than in the labour market at large. In some cases, dental hygienists work at more than one dental clinic.

Earnings
Current (1989) wages for dental hygienists in the Vancouver area range from $1,900-$2,600 per month for non-union positions and from $2,100-$2,700 for union positions.

The average annual employment income of the entire job group in B.C. was approximately $15,300 in 1986. Only 36% were employed full-time, full-year, and these workers' incomes averaged $21,000.

Related Occupations
General Duty Nurses, Radiological Technologists and Dental Products Sales Representatives.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,410	3,710	4,390

Annual Growth 1987-1995: 2.1%

Main Industries of Employment 1986 Census

Dentists' Offices	97%
Government	2%
Business Services	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
680	650	1,330

3162 Respiratory Technicians

Nature of the Work

Under the supervision of a physician, respiratory technicians treat patients who have cardiopulmonary (heart-lung) problems that interfere with breathing. The job is very important because a patient who stops breathing for more than three to five minutes usually suffers brain damage, and will die if oxygen is cut off for more than nine minutes. Respiratory technicians set up, operate and monitor special equipment including ventilators, positive pressure breathing machines and oxygen tents. Included in this occupational group are cardiology technicians who operate the electrocardiograph (ECG) to record a patient's heart action, in the form of a continuous graph. The readings are then used by a physician to diagnose the patient's cardiac disorder.

Workers in these occupations spend long periods standing and, in emergencies, work under a great deal of stress. Although some work in private clinics, most are employed in hospitals and this may require evening, nights and weekend work.

Education and Skills

Employment as a respiratory technologist requires completion of a Respiratory Therapy community college program. Cariboo College in Kamloops offers a three year program which prepares students to write the national registry examinations for the compulsory qualification of Registered Respiratory Therapist (R.R.T.) The program consists of two eight-month sessions of classroom instruction and clinical observation followed by 47 weeks of clinical training at accredited hospitals. Admission requirements include a strong background in high school algebra and sciences. Students are advised that since there are a limited number of places available in this program, applications should be submitted early. Cariboo College also offers correspondence, postgraduate and refresher courses.

No school in B.C. currently offers a program in cardiology technology, although Douglas College offers an introductory course for those interested in this area. To become a registered cardiology technologist requires two years of employment while being trained on an ECG.

Although some hospitals are beginning to request registration designation, it is not yet compulsory. To take the Canadian Society of Cardiology Technologists' registration exam, trainees must take a correspondence course from the Society during their two years of work experience.

Technicians should enjoy working with people. They must pay attention to detail, and operation of the sophisticated equipment requires both mechanical ability and manual dexterity.

B.C. Job Prospects

Job growth in this occupation was extremely strong between 1981 and 1987. Projections to 1995, which are based on the overall growth of the health field, call for jobs to grow about as fast as the average for all other occupations. However, this projected growth is likely to fall short of actual gains as critical care use of respiratory technology continues to gain in importance in hospitals. Despite this anticipated growth, this is a small job group in B.C. with the number employed in 1995 expected to be about 260. These conservative projections indicate an estimated 130 job openings expected over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system.

In B.C., the majority of respiratory technicians work in hospitals, in research institutions and in other health care services. There is a shortage of cardiology technologists in B.C. because training positions are difficult to obtain. Women were employed in 57% of these jobs in 1986.

Earnings

Entry-level salaries for respiratory technologists range from $2,055 to $2,500 a month and from $1,900 to $2,300 a month for registered union cardiology technologists.

The average annual employment income of all B.C. technicians was approximately $24,200 in 1986. Seventy-nine percent were employed full-time, full-year, and these workers' incomes averaged $27,200.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	70	230	260

Annual Growth 1987-1995: 1.9%

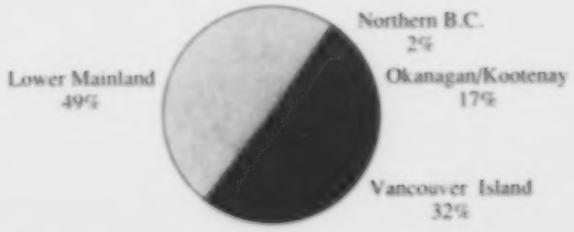
Main Industries of Employment 1986 Census

Hospitals	93%
Education	5%
Other Health Care	2%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
40	90	130

Employment by Region



33

Artistic, Literary, Recreational and Related Occupations

Product and Interior Designers 3313

Nature of the Work
Designers usually specialize in one type of product or activity, for example, clothing, furniture, stage-scenery, interior or industrial design. Designers usually develop sketches of several designs which they present for final selection to an art or design director; a product development team; a play, film or television producer; or a client. The designer then makes a model, sample or detailed drawing and often supervises workers who carry out the design. Those with their own businesses also must find clients. The work environment may be an overcrowded workroom or an office, home or store.

Education and Skills
For interior design, Kwantlen College offers a two year Interior Design Diploma Program. A portfolio and interview are required for admission. With this diploma and four years practical experience, students can write the national exam and become members of the Interior Designers' Institute of B.C. In Western Canada the only four year bachelor's degree program in interior design is at the University of Manitoba. BCIT offers a part-time evening certificate program in interior design that can be completed in two to four years.

For commercial design, most community colleges offer art programs, including Art in Merchandising; Digital Art and Design; Graphic Design/Commercial Art and two year programs in Fine Arts transferable to all fine or visual arts programs at the three public universities. The Emily Carr College of Art and Design offers four year programs in Graphic Design, Electronic Communication Design and Industrial Design. Those with appropriate work experience and a major in engineering, architecture or fine arts may gain entry into the industrial design field.

For fashion design, Kwantlen and Fraser Valley College offer one and two year Fashion Arts/Apparel Design programs. To become a furniture designer, a program in interior design or art is recommended. The Emily Carr College offers a four year program in Three-Dimensional Design that includes furniture design.

Regardless of the amount of formal training required, people in the design field must be creative, imaginative, persistent and able to communicate their ideas visually. It is important to note that although artistic talent remains the major qualification, technical skills are becoming more important. For example, industrial designers increasingly use computer-aided design to create new products or to improve existing ones.

B.C. Job Prospects
Although job growth in this occupational group was below average between 1981 and 1987, projections to 1995 call for jobs to grow faster than the average for all other occupations. This is a fairly large job group in B.C. with the number employed in 1995 expected to be 2,620. This includes an estimated 410 new job openings and 390 replacement opportunities expected over the projection period.

Product and interior designers in B.C. are primarily employed in retail trade, business services and the manufacturing sector. There is no distinct seasonal pattern of employment, although the incidence of part-time work is higher than average due to the heavy concentration of employment in the retail trade sector. More and more women have chosen this profession over the last several years, with their representation increasing from 48% to 71% between 1971 and 1986.

Earnings
The average annual employment income of this job group in B.C. was approximately $14,400 in 1986. Only 39% were employed full-time, full-year, and these workers' earnings averaged $21,800.

Related Occupations
Photographers, Architects and Engineers.

Employment by Region

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,190	2,210	2,620

Annual Growth 1987-1995: 2.2%

Main Industries of Employment 1986 Census

Retail Trade	41%
Business Services	22%
Manufacturing	12%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
410	390	800

3314 Advertising and Illustrating Artists

Nature of the Job

Occupations in this group include advertising, commercial and graphic artists, and medical and scientific illustrators. These artists create designs, illustrations, cartoons and caricatures for the advertising, entertainment and information fields. Their work environment is usually a well-lit studio conducive to the production of clean, attractive work.

Education and Skills

Previous specific training is not absolutely necessary for entry into this field as each person's background, aptitude and demonstrated ability are as important as formal education. Suitable characteristics include a broad knowledge of the various art forms, including photography, and a natural talent in art. Most employers ask applicants to present samples of their work and individual employers may have hiring practices that emphasize college training.

Grade 12, a portfolio and an interview are usually required for entrance to art programs at B.C. community colleges, the Emily Carr College of Art and Design and the three public universities. Programs in commercial art or graphic design offer the most specific training. Computer graphics is an area of increasing importance. Several colleges offer programs in digital art and design and have electronic publishing options that feature the latest computer software.

In addition to a college or university art program, prospective scientific and medical illustrators should have a basic knowledge of science, since most of the work is done in consultation with scientific and medical professionals. The only program in medical illustration in Canada is at the University of Toronto.

B.C. Job Prospects

The employment outlook for these occupations calls for about average growth to 1995, based on employment patterns in the business services and printing and publishing sectors. This is fairly large job group in B.C. with the number employed in 1995 expected to be over 3,000, including an estimated 830 job openings expected over the projection period, with about 430 resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. Competition for these jobs will be stiff. A 1982 survey of college graduates from two year commercial arts programs in Canada shows that of the 89% who entered the labour force, only 39% found employment as advertising and illustrating artists.

This occupational group is slightly vulnerable to changing business conditions, as reflected in recent employment patterns. Employment is not seasonal, although there is some slowdown during the winter months, nor is it directly affected by changes in technology. Advances in computer graphics, however, have greatly benefited graphic and commercial artists. Increasingly, employers are interested in persons who can utilize computer graphics along with artistic skills, such as for desktop publishing in clerical fields.

Most advertising and illustrating artists in B.C. are employed in business services; printing, publishing and allied industries; and miscellaneous manufacturing. The incidence of part-time work in these occupations is about the same as the average for all occupations. The increase in job opportunities for advertising and illustrating artists between 1981 and 1987 represented an important source of employment for women, whose proportion in this group grew from 34% to 42%.

Earnings

The average annual employment income of this job group in B.C. was approximately $16,300 in 1986. About 50% were employed full-time, full-year, and these workers' earnings averaged $24,100.

Related Occupations

Architects and Interior Designers.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,680	2,650	3,050

Annual Growth 1987-1995: 1.8%

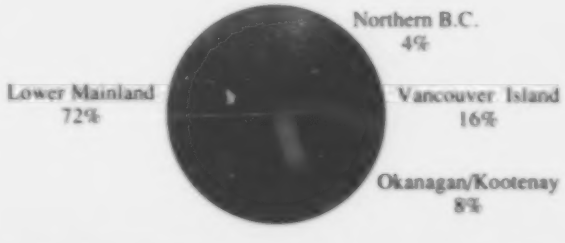
Main Industries of Employment 1986 Census

Business Services	45%
Printing & Publishing	18%
Miscellaneous Manufacturing	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
400	430	830

Employment by Region



Photographers and Camera Operators 3315

Nature of the Work

People in this group include commercial, industrial and aerial photographers as well as television and news camera operators. They may photograph people, events or materials, or operate a camera to film motion-pictures, television scenes or news events. Specialization in historical, medical and aerial photography is becoming commonplace. The work is either on location or in studios and laboratories and can involve extensive travel. Experience in these occupations often leads to supervisory and management positions in studios or processing laboratories. In addition, these occupations offer a good opportunity for self-employment, as people remaining in the field often open companies of their own. Those considering eventual self-employment should have a knowledge of business and bookkeeping techniques.

Education and Skills

There are two main paths into this field. After completing Grade 12 or a high school diploma, individuals can either start working with a firm that will provide two to six years of on-the-job training, or obtain a two year college diploma in a related program. Although the main prerequisites are talent and ability, education programs provide important instruction in the skills and techniques of photography.

Vancouver Community College offers a comprehensive two year Diploma in Photography which includes audio-visual, motion picture and videography as well as still photography. Emily Carr College offers a four year diploma program which emphasizes the pursuit of artistic expression when using the still photographic image. Admission requirements for both programs include Grade 12, an interview and a portfolio. All three public universities offer art and film programs that include the study of photography.

For prospective camera operators, Capilano College's two year Media Resources program includes film, video and audio courses. Camosun College offers a two year program in Applied Communication, which includes video and audio production. Emily Carr College has a four year Media Arts Diploma Program with an option in video production as a creative medium. Private schools in Vancouver and Victoria offer programs in areas such as photography, film and video production.

B.C. Job Prospects

Projections to 1995 call for these jobs to grow more slowly than the average for all other occupations. This is a medium size job group in B.C. with the number employed in 1995 expected to be about 1,400. This includes an estimated 320 job openings expected over the projection period, with most of them resulting from the need to replace existing personnel who leave.

The main industries of employment are photographic services; radio and television broadcasting; and printing and publishing. There is no distinct seasonal pattern of employment, although the incidence of part-time work is above average. The increasing use of visual aids in business and image-recording in medicine, law and science has been boosting the demand for technically competent personnel in this area. The representation of women in this occupational group increased significantly from 13% to 25% between 1971 and 1986.

Earnings

The National Association of Broadcast Employees and Technicians (NABET) reported 1986 minimum free-lance hourly rates of $24.00 for camera operators (features) and $40.00 for directors of photography (commercials). Salaries in 1987 for photographers employed by the federal government ranged from $19,000-$20,500 at the entry-level.

Current (1989) non-union wages for photographers working in commercial studios range from $1,500-$2,200 per month. Union wages range from $1,800-$3,400 per month.

The average annual employment income of this job group in B.C. was approximately $16,300 in 1986. Forty-three percent were employed full-time, full-year, and these workers' earnings averaged $21,800.

Employment by Region

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	940	1,270	1,360

Annual Growth 1987-1995: .8%

Main Industries of Employment 1986 Census

Photographic Services	66%
Radio & Television Broadcasting	10%
Printing & Publishing	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
90	230	320

3331 Conductors, Composers and Arrangers
3332 Musicians and Singers
3333 Other Music and Musical Entertainers

Nature of the Work

Included in this occupational group are choir directors and recording artists. Professional musicians usually work in rehearsal studios, concert halls, hotels, pubs and clubs. The jobs are with symphony orchestras, armed forces bands, rock groups, commercial studios, radio, television, opera, and musical theatre. They usually specialize in either classical or popular music. Performances are generally at night and on weekends, and travel is often required.

Some musicians rely on agents or managers to find them engagements, negotiate contracts and plan their careers. Musicians often supplement their income by making radio or television commercials or by teaching.

Education and Skills

The major requirements in these occupations are talent and ability. There are no standard education requirements. Conductors usually complete a four year conservatory or university program in music. Composers and arrangers normally require completion of a two year college or four year university program, and several years of private study with a composer is an asset. Although some popular musicians and singers are self-taught, partial or total completion of professional training is recommended. Concert singers usually begin training at an early age, either through private lessons or a conservatory and may complete a university degree in music. Bachelor degree programs are available at all three public universities. Most community colleges in B.C. offer university transfer programs in music as well as one and two year career programs for those who are not interested in pursuing a university degree. Admission requirements include an interview and audition. The music profession is very competitive and demands competency and talent. To succeed, musicians require a high degree of discipline and emotional stability.

B.C. Job Prospects

Although job growth in all three of these occupational groups was above average between 1981 and 1987, projections to 1995 call for jobs to grow about as fast as the average for all other occupations. Job growth is expected to be best for musicians and singers. These occupations make up a fairly large job group in B.C. with the number employed in 1995 expected to be over 2,700. This includes an estimated 380 new job openings and 490 replacement opportunities expected over the projection period.

These are occupations where self-employment predominates and they are susceptible to changing business conditions. Employment is seasonal and peaks in the fall and winter. In the off-season, performers work at summer festivals and resorts. Opportunities for full-time, full-year employment are much lower than the average for all occupations.

The two main industries of employment for musicians and entertainers in B.C. are in amusement and recreation, and accommodation and food services. Many who work in these occupations have a variety of entertainment or even other jobs throughout the year. Technological innovations, such as synthesized music and discotheques have affected this group. In 1986, women were one out of every four of these workers.

Earnings

In 1986, the basic union fees for musicians in commercials was $96.00 a session; in television and films $377 for the leader and $189 for each sideman; and in recording studios $162-$196 per three hour session. Members of symphonies earned $208 per three hour recording session. No fixed pay scale exists for singers. A principal singer on a 60-minute CBC TV variety special in 1987 earned a minimum of $623.

In 1986 the average annual employment income for conductors, composers and arrangers in B.C. was $9,600 and $12,100 for musicians and singers. Only 15% were employed full-time, full-year, and these workers' earnings averaged $15,700 for conductors, composers and arrangers, and $24,300 for musicians and singers.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,680	2,340	2,720

Annual Growth 1987-1995: 1.9%

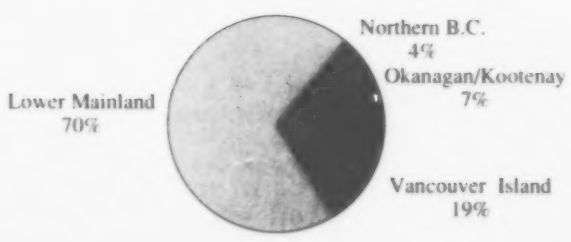
Main Industries of Employment 1986 Census

Recreation	77%
Accommodation & Food Services	6%
Federal Government	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
380	490	870

Employment by Region



Radio and Television Announcers 3337

Nature of the Work

This group includes broadcasters, disc jockeys, sportscasters and newscasters on radio and television. Disc jockeys select and announce music and provide commentaries to the public. Announcers at television stations and large radio stations usually specialize in a particular kind of programming such as sports events, general news broadcasts, or weather reports. They must have a thorough knowledge of their area and, if a written script is required, may do the research and writing. Work is usually in a radio or television studio or on site at a sports, entertainment or other public event.

Announcers work within a tight schedule requiring split-second timing and this can be physically and mentally demanding. Hours are often irregular and unpredictable.

Education and Skills

The basic requirement for entry into these occupations is graduation from a two year college program or a bachelor's degree program in a relevant field of study. The employer may provide three to twenty-four months of on-the-job training. BCIT offers a two year Broadcast Communications Program with options in radio, television and broadcast journalism. Grade 12 is required and students are advised that only a limited number of students can be accepted each year. Kwantlen College's Continuing Education Division offers an eight month, part-time broadcasting program in cooperation with radio station CISL.

Other important qualifications for entering this highly competitive area are a good command of language, a pleasant-sounding, clear voice and, for sports announcers, a thorough knowledge of sports.

High school courses in English, drama, foreign languages, plus sports and music hobbies, provide a valuable background for prospective announcers.

B.C. Job Prospects

Although job growth in this occupation was below the average between 1981 and 1987, projections to 1995 call for jobs to grow about as fast as the average for all other occupations. This is a medium size job group in B.C. with the number employed in 1995 expected to be about 1,030. This includes an estimated 140 new job openings and 70 replacement opportunities expected over the projection period. Turnover is high in these jobs and creates numerous job openings additional to those resulting from growth and attrition.

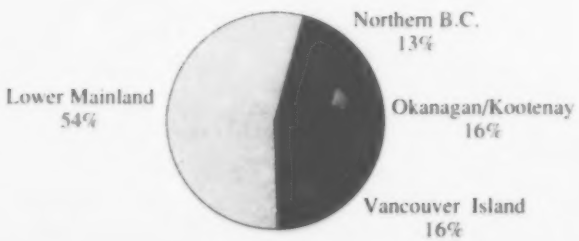
In 1987, unemployment was about the same as the average for all other occupations, indicating vigorous competition for jobs. Some work is available on a contract basis and this is reflected in the higher than average rate of part-time employment. The impact of advancing technology in programming equipment will be moderate.

More and more women have chosen this profession over the last several years, with their representation increasing from 2% to 19% between 1971 and 1986.

Earnings

The average annual employment income of this job group in B.C. was approximately $24,200 in 1986. Fifty-three percent were employed full-time, full-year, and these workers' earnings averaged $33,000.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	900	890	1,030

Annual Growth 1987-1995: 1.9%

Main Industries of Employment 1986 Census

Radio & Television Broadcasting	96%
Miscellaneous Services	2%
Recreation	2%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
140	70	210

Nature of the Work

This classification includes advertising editors, copy writers, columnists, film editors, news reporters and press writers, whether free-lance or employed. They write, research and prepare material for newspapers, books, magazines, technical manuals and trade journals. While creativity is important, news writers and technical writers, for example, are primarily concerned with the accurate, concise conveyance of information. The work site varies with the job but generally writers work in an office with colleagues. Advancement and other opportunities exist in writing-related occupations, such as public relations and teaching.

Education and Skills

Employment as a journalist usually requires completion of a community college program in journalism or communication, or a university degree program in journalism, English, creative writing or liberal arts. None of B.C.'s universities offer a journalism program, but the other programs mentioned are available. UBC has approved a graduate school of journalism to be established at some future date. Degree programs in journalism are available at Carleton University in Ottawa and Ryerson Polytechnical Institute in Toronto. Several B.C. community colleges offer two year programs in Communications, Journalism and Writing/Editing. Typing or computer keying ability is essential.

Editing and publishing positions usually require a bachelor's degree in the liberal arts for those in the book industry and a degree in journalism for those working on periodicals. SFU's Canadian Centre for Studies in Publishing plans a master's degree in publishing covering all aspects of publishing, editing, research and management skills. SFU's downtown campus offers courses in editing, copy editing, publishing and book promotion. Familiarity with word processing and desktop publishing is an asset.

Employment as a technical writer usually requires a two year college technology or university program in a field related to the writer's area of specialization. Completion of graphic or commercial art courses is recommended. SFU's downtown campus offers technical writing courses and BCIT offers writing for the computer industry.

B.C. Job Prospects

Projections to 1995 call for jobs in this occupational field to grow more slowly than the average for all other occupations. However, interest in Canadiana, locally produced magazines, videos and advertising, all should have a positive influence on employment prospects for these occupations. This is a large job group in B.C. with the number employed in 1995 expected to be about 3,780. This includes an estimated 1,050 job openings expected over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system.

Although new technology, such as word processors, electronic databases and data processing equipment, has enabled writers and editors to perform tasks faster and more efficiently, it has not affected their current employment situation.

Employment is generally year-round, with no seasonal pattern, although the rate of part-time work is slightly higher than the average for all occupations. The main industries of employment in B.C. are miscellaneous services; printing and publishing; and radio and television broadcasting. More and more women have chosen this profession over the last several years, with their representation increasing from 33% to 48% between 1971 and 1986.

Earnings

Writers' earnings depend on whether they're free-lance or employed, the type of writing, and for whom they work. The average annual employment income of this job group in B.C. was approximately $18,600 in 1986. Forty-nine percent were employed full-time, full-year, and these workers' earnings averaged $26,700.

Related Occupations

Journalism Instructors and Public Relations Officers.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,690	3,470	3,780

Annual Growth 1987-1995: 1.1%

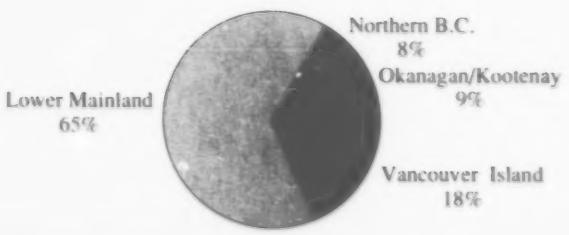
Main Industries of Employment 1986 Census

Miscellaneous Services	35%
Printing & Publishing	34%
Radio & Television Broadcasting	13%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
310	740	1,050

Employment by Region



Coaches, Trainers and Instructors: Sports and Recreation 3370

Nature of the Work

This job group includes athletic coaches and trainers; skating, skiing, and swimming instructors; and physical training directors. Their job is to coach, train, and direct athletes for team sports, individual competition and recreational sport. Other activities include administering and directing athletic programs, negotiating contracts with players and giving instruction in the theoretical and practical aspects of sports and recreation. These coaches, trainers and instructors are employed by professional and amateur sports teams, universities and colleges and private athletic clubs.

As competitions are often scheduled on weekends and evenings, these jobs require travelling and irregular work hours.

Education and Skills

In addition to several years experience in the particular sport, employment in these jobs usually requires Grade 12, with completion of a bachelor's degree in physical education or kinesiology preferred. At the post-secondary level, trainers and instructors may be required to have master's degrees. Even volunteer coaches of amateur teams are increasingly required to achieve certification at coaching clinics.

UBC offers a four year bachelor's program in Physical Education, SFU offers one in Kinesiology and UVic ones in Physical Education, Human Performance or Leisure Studies. The community colleges offer a variety of programs, some with university transfer credit. These include P.E. and Recreation, Outdoor Recreation, Recreation Leadership/Aquatic Specialist and Exercise Science. SFU also offers a part-time certificate program in Health and Fitness Studies for uncertified sports coaches.

The Continuing Education divisions of several community colleges offer national coaching certification and fitness leadership courses.

Coaches and instructors must have a thorough knowledge of their particular sport and exceptional leadership and teaching skills.

B.C. Job Prospects

Although job growth in this occupation was well above average between 1981 and 1987, projections to 1995 call for jobs to grow about as fast as the average for all other occupations. Nevertheless, this is a fairly large job group in B.C. with the number employed in 1995 expected to be about 3,400. This includes an estimated 450 new job openings and 390 replacement opportunities expected over the projection period. The main industries of employment for these workers are recreation, municipal government and personal services.

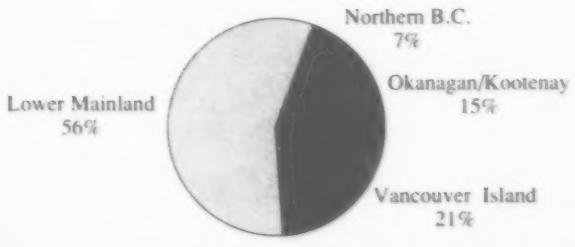
Employment in this occupational group is only mildly susceptible to changing business and economic conditions. Coaches and instructors often work in the evening and on weekends and hold other jobs during the day, which partly explains the high incidence of part-time work. Employment may be seasonal in certain sports. The stability of a coaching position often depends on team performance and public interest in attending games or events.

More and more women are working in this area of athletics, with their representation increasing from 46% to 63% between 1971 and 1986.

Earnings

The average annual employment income of this job group was approximately $8,900 in 1986, but this includes large numbers who worked part-time and part-year. Only 15% were employed full-time, full-year, and these workers' earnings averaged $23,300.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,980	2,940	3,390

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Recreation	48%
Municipal Government	24%
Personal Services	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
450	390	840

41

Clerical and Related Occupations

Nature of the Work

Secretaries, including clerk-stenographers, departmental secretaries, legal secretaries and medical secretaries are the largest group of information-based jobs in the economy. They perform a variety of office duties that help us to communicate: type, shorthand, answer telephones, open mail, file, photocopy, schedule appointments and draft letters. Understanding the technical language used in a particular area such as commerce, law or medicine is often essential.

The use of computer technology in word processing, data bases, desk-top publishing and spreadsheets are now commonplace and are changing both the way work is done, who does it, and the skills required.

Employment in this predominately female occupation (99% are women) is steady year-round, with about one job in five being part-time.

Education and Skills

High school graduation with courses in business is the usual requirement, but increasingly a Grade 12 secretarial career preparation certificate and a college level office program is required. All B.C. community colleges offer secretarial, word processing, computer application programs, and legal and medical secretary preparation. Administrative programs are available for those seeking supervisory and administrative positions.

Secretarial education is offered at a variety of business colleges throughout the province. There is also a Certified Professional Secretarial Program developed by the Professional Secretaries Association (C.P.S.).

In cooperation with the Attorney General of B.C., Vancouver Community College offers a 20-month Court Reporter Program which prepares students in verbatim machine shorthand for free-lance and court reporting. Applicants must have Grade 12 graduation, pass an admission test and type 40 wpm.

Computer use has produced a demand for secretaries who can cope with change and adapt to new technologies. This requires learning to operate new word processing, information storage and other systems.

For some, this occupation may be an entry position. After a few years of experience and further training, a stenographer/secretary could be promoted into an administrative or supervisory position.

Graduates in business, commerce or finance fields may enter this occupation, as well as university graduates who may compete when the general labour market is weak.

B.C. Job Prospects

Secretaries and stenographers are the third largest job group in B.C. and by 1995 are expected to employ about 45,190 persons. The growth rate is projected to be at the all-occupation average, but could be kept lower because of productivity gains arising from the new technologies. For example, it's estimated that one word processor operator can now do the work of 1.8 typists.

Based on average growth, a total of 14,840 openings will occur with 8,980 due to attrition and the rest from new job creation. Unemployment is currently about average, indicating that the competition for jobs is fairly vigorous across the group. However growth and employment opportunities have been far better for those with a specialist background, such as legal, or with administrative skills.

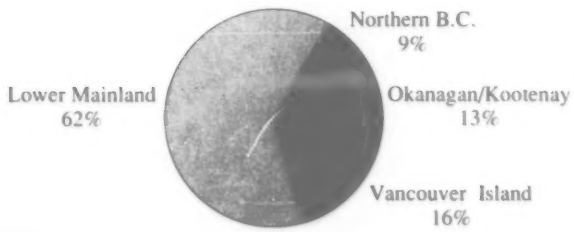
Employment is broadly distributed across all government and business with some concentration in the business and personal service sector (21%), finance, insurance and real estate (13%), and education (11%).

Earnings

Earnings vary according to years of experience and area. In 1988, Vancouver area monthly salary ranges were: junior and intermediate secretaries, $1,200- $2,000; senior secretaries, $1,500-$2,400; and executive and specialist secretaries, $1,800-$2,500. Salaries in smaller communities are generally lower.

In B.C. the 1986 Census reports that full-time, full-year workes had an average employment income of $21,200. According to the 1986 census, the average income in B.C. across this occupation was $14,900, and $19,800 for full-time, whole year workers.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	33,450	39,330	45,190

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Business Services	21%
Finance, Insurance & Real Estate	13%
Education	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
5,860	8,980	14,840

Nature of the Work

This category primarily includes teletypists, word processing operators and clerk-typists. Depending on their particular function, typists may operate telegraphic typewriters, composing machines, teleprinters, word processors or typewriters in working environments ranging from a large typing pool to a small office in a wide range of industrial sectors.

The introduction of automated office equipment will require employees with diverse qualifications and new skills to operate these machines.

Education and Skills

The oversupply of qualified candidates for job openings favours those who have completed high school and have excellent typing skills. Those who have acquired additional skills in business machines, word processing, microcomputers or oral and written English are further improving their chances of finding employment. Office administration programs at B.C.'s community colleges include: Clerk Typist, Computer Applications and Word Processing. The programs last from one to ten months and require Grade 10, with Grade 12 recommended.

Typists should have a pleasant manner and a good command of written and spoken English. Experienced typists who demonstrate interest and pursue further training may move to secretarial and administrative assistant positions.

B.C. Job Prospects

Job growth in this occupational group was well below the average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow more slowly than the average for all other occupations. This is mainly based on growth prospects for the services, government administration and finance sectors. Typists make up a fairly large job group in B.C. with the number employed in 1995 expected to be about 4,790. This includes an estimated 1,410 job openings expected over the projection period, with about 850 resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system.

The spread of office automation and the decline in cost of computer hardware and software has created more part-time positions and slowed the rate of employment opportunities for typists and clerk typists in favour of secretaries with administrative or specialist topic knowledge skills, such as legal secretaries.

Unemployment is high when compared to that of the labour force in general, suggesting that competition for job vacancies may be quite stiff. Most typists in B.C. are employed in government administration (24%); the finance, insurance and real estate sectors (18%); and business services (10%).

The incidence of part-time employment is greater than the average for the labour market at large, and employment prospects are best for those who know how to use the new and rapidly changing technology, particularly in the area of word processing. Women predominate in this occupational group, with a representation of 97%.

Earnings

The average annual employment income of this job group in B.C. was approximately $12,600 in 1986. Only 39% were employed full-time, full-year, and these workers' earnings averaged $19,200.

Current (1989) non-union wages for typists range from $900-$1,650 per month. Union wages range from $1,180-$1,860 per month.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	9,980	4,230	4,790

Annual Growth 1987-1995: 1.6%

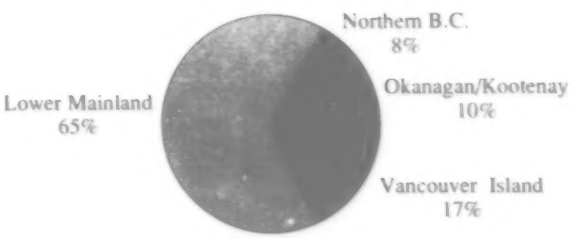
Main Industries of Employment 1986 Census

Government	24%
Finance, Insurance, & Real Estate	18%
Business Services	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
560	850	1,410

Employment by Region



Nature of the Work

Every business needs systematic and up-to-date records of accounts and business transactions. It's not surprising then that the second largest occupational group in the B.C. economy includes accounting clerks, audit clerks, bookkeeping clerks and payroll clerks. They provide statistical and financial record keeping, maintain and verify systematic records and sometimes prepare financial statements. They use calculating, cheque writing, bookkeeping machines and, increasingly, computers. Technology has increased the capacity of electronic record keeping and has thus increased the productivity of bookkeepers, while at the same time reducing the need for clerical staff to an extent.

There has been a notable increase in part-time work in this occupational group and over 15% of jobs are permanent part-time. There is little seasonal variation in employment. These jobs attract a large number of women, nearly nine of every ten bookkeepers working in B.C. are women.

Education and Skills

The minimum qualifications required vary from employer to employer, but most look for employees who have high school graduation with courses in accounting, typing, business and office procedures. Completion of a college program that includes mathematics, data-processing and basic accounting is an asset. Available at all B.C. colleges, and by correspondence through the Open Learning Agency, these bookkeeping and accounting programs last three to twelve months.

Knowledge of computers and computerized accounting systems is essential for the majority of accounting positions today. Upgrading courses and programs in computer skills are offered by many colleges. For those who want to advance, there are one and two year accounting management programs. And, for those who pursue further training and education and who demonstrate strong working skills, there are opportunities for advancement into supervisory positions.

Bookkeepers need to be good at working with numbers and concentrating on details. They should enjoy team work.

B.C. Job Prospects

Average growth is projected to 1995 keeping this occupational group the second largest job group in the province. Job openings to replace attrition and new jobs are projected to create a total of 16,960 employment opportunities, typically about 2,100 openings annually. Employment in this group declined from 1981 to 1987 by nearly 5,000, and this reflects technological rather than industry or business cycle change.

Continued advances in microprocessor-based technology and an expanding range of applications which improve productivity are expected to shift jobs toward accountants and accountant technologists. Given the likelihood of continued technological change, the prospects for bookkeeper and accounting clerk openings will still be large in number but the rate of growth may be dampened.

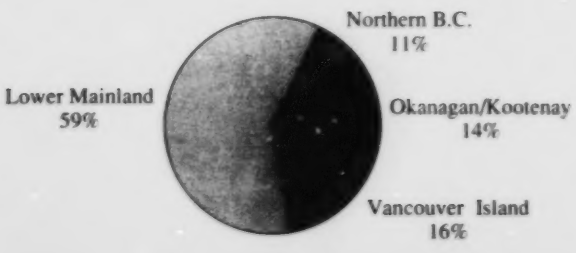
Current unemployment is approximately at the 3,000 level, which is above the number of annual projected openings, suggests that competition for jobs is strong. Jobs are distributed throughout all business, industry and government with some concentration in the wholesale and retail trade (23%), business services (12%), finance, insurance and real estate (11%), and manufacturing (11%).

Earnings

Wages depend on the work performed, the experience of the worker and the geographic location. In 1988 monthly salary ranges in the Vancouver area were: junior accounting clerk $1,200-$1,570; intermediate accounting clerk $1,400- $1,800; senior accounting clerk $1,750 - $2,100. Monthly salaries for junior bookkeepers ranged from $1,200-$2,100 and for senior bookkeepers from $1,500-$2,500.

Provincially, the average annual employment income for these occupations, based on the 1986 Census, was $15,000, and $20,800 for those working full-time over the whole year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	49,380	44,380	51,140

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Retail & Wholesale Trade	23%
Business Services	12%
Finance, Insurance & Real Estate	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
6,760	10,200	16,960

4133 Cashiers and Tellers

Nature of the Work

This large group includes bank tellers, disbursement clerks, restaurant cashiers and grocery cashiers. They handle money, keeping records of the transactions either manually or electronically, and reconcile errors. Adding machines, cash registers, cash machines or change makers are used in most of these occupations. With increasing use of computers, transaction recording is now mainly electronic.

Supermarkets, department stores, movie theatres and restaurants are among the many businesses that employ cashiers. Tellers are generally employed by banks, credit unions and trust companies. These jobs are found throughout B.C. in the services industry with some concentration in retail trade (53%), banking (24%) and the accommodation and food sector (10%).

Part-time work is prevalent with permanent part-time accounting for nearly one quarter of all jobs. The majority of cashiers are young, and nine out of ten are women.

Education and Skills

The entry-level education required is Grade 12, preferably with business courses, or some business experience. Cashiers are usually trained on-the-job but completion of a pre-employment program is an asset. BCIT offers a three week Cashier Training Program which provides instruction on electronic cash registers.

Tellers generally receive eight to twelve weeks on-the-job training, but related experience or completion of a teller training program is preferred. Okanagan College and several private schools offer such programs, as do local school districts through night school classes.

Cashiers and tellers need an aptitude for working with numbers and should be able to do repetitious work accurately. Neatness, tact, patience, personability and the ability to work under pressure are important. This occupation is entry-level with some possibilities for advancement to customer service representative or supervisor.

B.C. Job Prospects

This is the fifth largest occupation in B.C. Projected employment is expected to increase above the all-occupation average bringing total employment to 37,690 by 1995. Total employment openings will number about 11,800, or about 1,680 annually, with roughly half of the openings due to attrition.

Computers, automated teller machines (ATMs) and electronic cash registers have changed these jobs. ATMs are an example where technological substitutions for workers may reduce new job growth to an average or below average rate. Increasing productivity has also resulted from integrating different jobs in the retail sector. One example is in supermarkets, where laser scanners are linked to a main computer which automatically prices items, prepares customers' receipts and revises the store's inventory record.

Employment is generally stable throughout the year and isn't strongly affected by economic recession. From 1981 to 1987 net employment increased by about 3,500.

Reflecting the ease of entry into these jobs, there is a large number (about 5,000) of experienced people who are currently unemployed. Competition for jobs is expected to be vigorous even while employment growth is above average.

Earnings

Wages vary regionally and depend on the work performed, the type of business and the industry. In 1988 in the Vancouver area, hourly earnings of grocery cashiers ranged from $5.50-$8.50 in a non-union setting and $12.48-$13.57 in a union setting. Non-union restaurant cashiers wages range from $4.50-$8.50 and union ranges were from $5.35-$9.59. Monthly earnings of non-union tellers averaged from $1,100-$1,600 and union ranges were from $1,400-$1,900.

According to the 1986 Census, the average employment income for all workers in B.C. in these occupations was $9,400, and $17,700 for those 21% working full-time over the whole year.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	27,110	31,540	37,690

Annual Growth 1987-1995: 2.3%

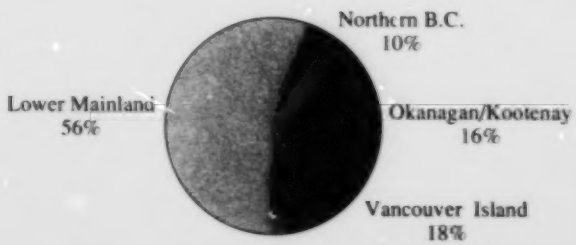
Main Industries of Employment 1986 Census

Retail Trade	53%
Finance, Insurance & Real Estate	24%
Accommodation & Food Services	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
6,150	5,650	11,800

Employment by Region



▶ Insurance, Bank and Other Finance Clerks 4135

Nature of the Work

A finance clerk's duties include processing forms, compiling data, keeping records of transactions, and receiving cheques and cash for deposit. To a large extent the work performed is directly related to the type of firm. Insurance clerks review insurance applications; calculate premiums, dividends, and cash-surrender values; and make insurance policy changes. Bank clerks handle the processing of loan and mortgage applications, check ledgers, keep records, sort deposit slips and cheques, rent safety-deposit boxes, and prepare and distribute bank account statements. Real estate clerks compile rental, sales and management information.

This group is predominantly composed of women. Over the last 15 years, their representation has increased, as has the proportion of those between 25 and 54 years of age. Generally, a person will enter the occupation between the ages of 20 and 29 and retire at approximately 60 years of age, for an average career length of 30 to 40 years.

Finance clerks usually work in pleasant job environments.

Education and Skills

In some instances these are entry-level jobs and they often follow a period as teller or receptionist. They offer an opportunity to learn the organization of the firm and the type of people and customers they serve. Entrants to this occupational group should have at least a high school diploma, good communications skills, the ability to work rapidly and accurately with figures, and be familiar with computers and data-processing techniques. Changing regulations governing the financial sector will require a basic knowledge of business administration and finance.

Some employers also recruit graduates from trade/vocational schools, community colleges, private educational institutes and even universities. Most will provide newly hired personnel with on-the-job training specific to the firm, lasting between one to 24 months. Possibilities for advancement into supervisory, administrative and management positions exist for individuals interested in promotion within an organization.

B.C Job Prospects

Jobs for finance clerks grew very rapidly in the 1970s and early 1980s, and by 1987 approximately 6,780 people were employed in this large B.C. job group.

Based on growth prospects for the finance sector, especially in the Vancouver area, the employment outlook for these occupations calls for above average growth over the forecast period to 1995. Approximately 3,000 jobs are expected to open up over this period, half of which will be generated through attrition. However, technological changes and increased usage of electronic data processing equipment in larger organizations may have a dampening effect on projected growth rates.

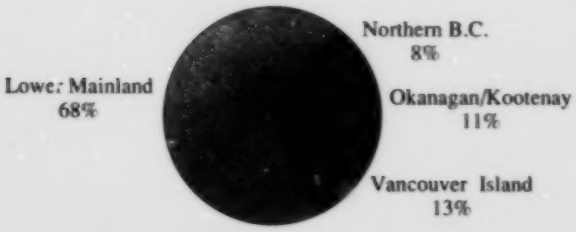
At present, finance clerks are facing lower unemployment levels than the labour force at large. Employment in this group does not tend to be particularly sensitive to economic conditions. While part-time work has increased substantially, employment tends to be stable year-round.

Earnings

In 1989, hourly wages for finance clerks ranged from $7.00 to $10.00 for positions at an intermediate level. Wages tend to vary considerably with the type of employer, the area of employment, and qualifications and experience of the worker.

According to the 1986 Census, those who worked full-time, full-year, in B.C. earned an average employment income of $19,700.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,130	6,780	8,350

Annual Growth 1987-1995: 2.6%

Main Industries of Employment 1986 Census

Finance, Insurance & Real Estate 96%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,570	1,400	2,970

Nature of the Work

This occupation describes people who use office machinery such as duplicating machines, calculators, cheque writing machines, mail sorting machines, embossing and microfilming equipment. As one would expect, many of these machines are now superseded by computers.

Many of the tasks covered in this field reflect the physical handling of letters and papers in offices. Copies are made, sorted and collated, cheques are written, bills are prepared, and mail is sorted. The introduction of computers to offices means that many of these tasks are now performed by a computer or a computerized office machine and the operator's job is now to make sure that the computer or machine is working correctly. In some instances the computer is instructed by someone else, as in preparation of bills, so there is no need for a separate machine operator. In this case an accountant or accounting clerk simply uses the computer to handle work that otherwise might have called for a separate office equipment operator. Easy to use copying machines and fax equipment have started to allow other office workers, from general office clerks to management workers, to handle more and more of the paper flow without special equipment operators.

Given the changes taking place in this occupation it would be appropriate for someone considering work in this field to also look at general office clerks or printing press operators as additional fields (SOC 4197 and SOC 9512).

Education and Skills

Office jobs generally require Grade 12 with good English and, depending on the field of work, math skills. Many organizations hire high school graduates and train them on the job. Other employers may require completion of a business office training course from a community college or business school. Most community colleges offer a three to five month Office Clerk Program which gives entry to jobs such as duplicating machine operator and mail clerk.

B.C. Job Prospects

This occupational field showed a decline in employment between 1981 and 1986 and is currently estimated as a rather small office field employing just over 900 people in 1987. Technological impacts are not numerically added into the forecasts and the projections do show some growth for this occupation. Growth, along with job openings from attrition, is projected to provide a little over 330 openings to 1995. However, the shift to computers and to more automated equipment in offices will limit opportunities across this field.

Some remaining specialized areas such as duplicating equipment operators for central copying services, mailroom equipment use, sorting equipment operators and microfilm production are more likely to show the impact of technology through changing job functions and skills.

Reflecting the types of jobs still found in this occupational group, employment is concentrated in finance, insurance and real estate (19%), business services (12%) and government (16%).

Earnings

The average employment income for all workers in this field in B.C. was reported by the 1986 Census as $16,400 and for full-time, full-year workers the average was $21,800.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,480	930	1,050

Annual Growth 1987-1995: 1.6%

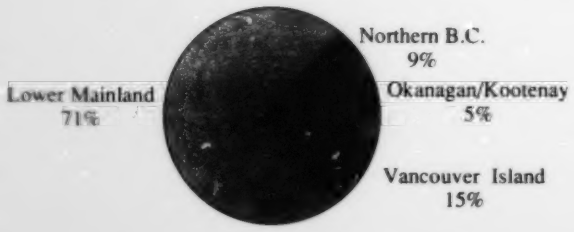
Main Industries of Employment 1986 Census

Finance, Insurance & Real Estate	19%
Government	16%
Business Services	12%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
120	210	330

Employment by Region



▶ Electronic Data-Processing Equipment Operators 4143

Nature of the Work

This is a job where individuals enter in information, often financial, about people or products, primarily using a computer keyboard. Typically they work for large organizations such as ICBC, banks, and government offices where records are kept, such as Revenue Canada. They operate computers that record, store, process and transcribe data. Usual job titles are computer operator, data-input operator and keypunch operator.

Computer operators execute instructions prepared by computer programmers, schedule programs entered through remote terminals, monitor peripheral machines and keep records of operating times. When a problem is encountered, they may take corrective measures or report the malfunction.

Those in this occupational group work with a variety of electronic machinery and may be exposed to machine related noise.

Shift work and overtime are occasionally required but employment is generally full-time over the whole year. Women have increased their participation in this occupation and now account for eight out of ten jobs.

Education and Skills

These jobs typically require Grade 12 with a math background. Many organizations like to hire high school graduates and train them on the job for six months to two years. Others may hire applicants who pass a qualifying exam and who have experience in data processing.

Graduation from a community college program is an asset. All B.C. community colleges offer two year computer technology, computer information systems and data processing programs. Grade 12, with Algebra 11 is the minimum education admission requirement. Many courses in these programs have transfer credit in computer science at UBC, SFU and UVic.

B.C. Job Prospects

Jobs for computer operators grew rapidly in the 1970s and 1980s and by 1987 employed 10,580 B.C. workers, making this a very large occupational group. While projections to 1995 are for employment growth below the all-occupation average, this will still result in a healthy level of total employment of about 11,900. The majority of the nearly 3,000 total openings over this time will be from attrition, and about 1,310 new jobs are expected.

At present, computer operators are facing about the same unemployment levels as other occupations.

Employment is broadly distributed among all industries with concentration in data processing and other business services (22%), in government (16%), in finance, insurance and real estate (14%) and in the wholesale and retail trade (14%). These occupations are somewhat susceptible to economic downturns.

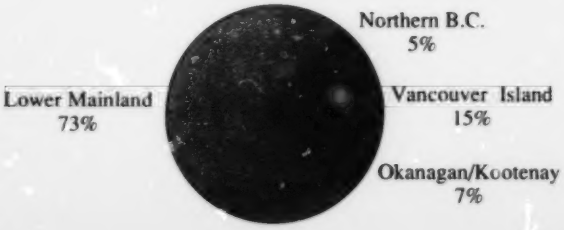
Technological changes will continue to affect employment growth in this field and as the use of microcomputers and real-time/on-line systems grow, emphasis on batch systems will decline, reducing the need for data-input and keypunch operators. The actual data input will be undertaken by those in the related clerical, administrative, or sales occupations.

Earnings

According to the 1986 Census, the average employment income for these occupations was $16,700, and $21,900 for full-time, full-year workers.

Wages vary according to the job functions and the size of the organization. In 1988 in the Vancouver area, junior computer operators in a non-union position averaged from $1,250-$2,000 monthly; and in a union position, from $1,700- $2,500. At the senior level, in a non-union position, they averaged from $1,400-$2,300; and $1,800-$2,600 in a union position. Non-union data entry clerks averaged from $1,100-$1,900, and union clerks from $1,300-$2,200.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	8,460	10,580	11,890

Annual Growth 1987-1995: 1.5%

Main Industries of Employment 1986 Census

Data Processing & Business Services	22%
Government	16%
Finance, Insurance & Real Estate	14%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,310	1,610	2,920

Nature of the Work

Production clerks (including production coordinators, schedule clerks and expediters) coordinate and expedite the flow of work and materials between departments or plants. This entails examining orders for goods and services, preparing work and production schedules, routing materials and parts for fabrication and repair, reviewing and maintaining inventory and production records and compiling records and reports. Production clerks often work in a factory setting. A five-day work week of 37 to 40 hours is normal. Shift work may be required. Production clerks' work is generally full-time and is not affected by seasonal factors.

Education and Skills

The minimum qualification for this occupation is a high school diploma, preferably with courses in mathematics, typing, business machines and accounting. Basic computer skills are becoming a necessity for production clerks. Most employers will provide new entrants with on-the-job training that may last from three to twelve months.

Applicants should be able to keep good records and to read and follow detailed instructions correctly and quickly. Verbal communication skills are required to communicate with other workers and to report the progress of operations. Use of computers requires at least basic computer keyboard skills.

B.C. Job Prospects

Since most production clerks work in the manufacturing, services and trade sectors, economic conditions affecting those industries tend to determine employment trends. For example, the recession that started in 1981 combined with the introduction of new technology and lowered employment of production clerks 31% between 1981 and 1987. Production clerks accounted for about 840 jobs in B.C. in 1987, a small occupation. Current projections indicate a slightly greater than average growth rate of 2% to 1995, however computerization of some functions in this occupation will likely hold growth back and require higher skills of those employed in the future. Statistical Process Control (SPC) systems, computerized inventory systems and automated scheduling are examples of such technological innovation. Replacement requirements of 130 jobs combined with growth mean that about 270 openings will be available for production clerks between 1988 and 1995.

Women have been entering this occupation in growing numbers. Their representation increased significantly from 1971and now they account for nearly half of the production clerk labour force.

Earnings

The 1986 Census indicates that production clerks in B.C. earned about $25,000 if they worked full-time for the full-year.

Related Occupations

Routing Clerks and Stock Clerks.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,200	840	980

Annual Growth 1987-1995: 2.0%

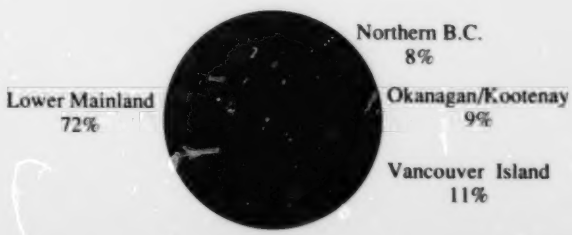
Main Industries of Employment 1986 Census

Manufacturing	56%
Services	17%
Wholesale & Retail Trade	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
140	130	270

Employment by Region



▶ Shipping and Receiving Clerks 4153

Nature of the Work

A shipping clerk's main responsibilities are to coordinate the shipment of goods to customers and to keep up-to-date inventory records. Other duties include assembling, packing, addressing and loading goods for delivery. Receiving clerks perform the reverse of these functions. They receive, unpack, inspect, sort and record incoming goods. In many instances, these responsibilities are combined in a single job. Examples of occupations are delivery checker, freight clerk and warehouse receiver.

This work requires physical movement such as lifting, carrying and reaching. Although shipping and receiving clerks generally work indoors they may spend considerable time on outside loading platforms. Indoors the work places are often large open areas that may be drafty and cold. Shift work and weekend work are often required in this occupation.

Many shipping and receiving clerks view this occupation as a step to a higher position. They first familiarize themselves with the type of work done in the industry; then, with experience and further training, they move to other occupations with more responsibility and better pay.

Education and Skills

No specific field of study leads to employment in this group. Over the past few years, the educational requirement for entry into the occupation has changed from Grade 10 to high school graduation.

Most shipping and receiving clerks start out as warehouse workers and may be promoted into a shipping or receiving clerk's position, if they prove competent and demonstrate an interest in paperwork. Since all firms have their own operating standards, new employees must undergo on-the-job training varying from four to six weeks. Desirable qualities for shipping and receiving clerks include good math skills and an aptitude for detailed, accurate work. Basic computer skills are increasingly required as computers are used more and more in this work.

B.C. Job Prospects

Since most shipping clerks are employed in the manufacturing and trade sectors, they tend to be affected by prevailing economic conditions. As a result of the recession of the early 1980's and technological change, employment in this occupation has declined and in 1987 employment remained 7% below 1981 levels. With employment of 8,380 this is a large job group. Employment growth is projected at 1.3% per year to 1995, a rate lower than the average. Attrition is expected to create 1,180 openings in the same period reflecting a high rate of transfer and promotion, for a total number of openings of about 2,000 between 1988 and 1995. Technological innovations such as point of sale (P.O.S.) systems with on-line inventory control features may also limit employment openings in this occupation. Computer skills will increasingly become a necessity.

Women represented 20% of all shipping and receiving clerks in 1986.

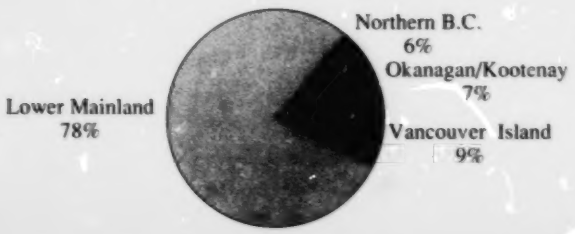
Earnings

At the time of the 1986 Census shipping and receiving clerks in B.C. who worked full-time for the whole year earned $24,188 on average. In 1987 wage rates varied from $7 to $14 per hour depending on the industry and the experience of the individual. The higher rates are generally found in unionized work places.

Related Occupations

Stock Clerks, Order Fillers and Distribution Clerks.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	9,050	8,380	9,250

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Wholesale & Retail Trade	47%
Manufacturing	29%
Transportation	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
870	1,180	2,050

4155 Stock Clerks and Related Occupations

Nature of the Work

Stock clerks are the contact point between the customer department and the supplying department. They are responsible for receiving, storing and distributing supplies, and monitoring and replenishing inventory as required. They must therefore have an orderly and systematic approach to locating items. Stock clerks also prepare the necessary paperwork to maintain an inventory. The paperwork is increasingly being transferred to computers for filing and inventory control.

Depending on the employer and the type of stock, clerks may have to work in cold, drafty warehouses and handle large, heavy items. Examples of occupations are central supply clerk, material keeper, purchasing clerk, and stockroom attendant. While most workers in this group work full-time, there is a significant component of part-time workers.

A closely related skilled trade is parts person, automotive and industrial, (see profile SOC 5135, sales clerks and salespersons, commodities).

Education and Skills

There are no specific education requirements to become stock clerks, although Grade 12 is the usual minimum requirement with training provided on-the-job. Those with courses in business and administration at the trade or college level are preferred.

For those who would like to become inventory control professionals, BCIT offers an option in materials management within its two year Operations Management Program which includes computer applications and warehouse and inventory management. Warehouses are making increasing use of computers for filing and inventory control so stock clerks should be proficient in their use. Employers look for people with good math skills, the ability to perform fast and accurate calculations and a capacity for detailed work.

B.C. Job Prospects

Since most stock clerks are employed in trade (55%) or manufacturing (13%), fluctuations in economic conditions affecting these two industries also influence employment. The recession of the early 1980s combined with technological change produced a 13% decline in employment between 1981 and 1987 to 8,670 employees. This is a large occupation in B.C. and growth to 1995 is expected to be at an average rate for a total of 1,220 new jobs. The majority of the total of 2,630 openings forecast between 1988 and 1995 will be created by replacement demand as stock clerks retire or are promoted or transferred. Slower growth may result due to continued application of computer technology, which will also increase the skill requirements of stock clerks in the future.

Women represented 35% of employees in this occupation in 1986, up from 25% in 1971, as proportionately more women enter this occupation.

Earnings

Average employment earnings for a full-time, full-year worker were $24,279 as measured by the 1986 Census. Vancouver area hourly wage rates in 1989 were between $6.00 and $12.00 per hour in non-union work places and ranged from $10.50 to $15.32 in unionized work places.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	9,890	8,670	9,890

Annual Growth 1987-1995: 1.7%

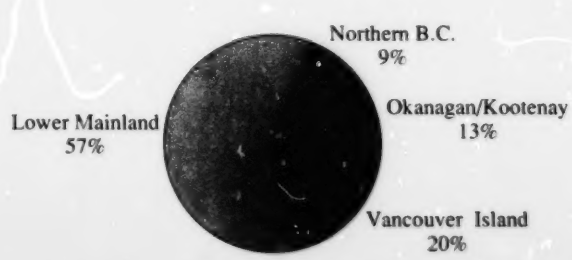
Main Industries of Employment 1986 Census

Wholesale & Retail Trade	55%
Manufacturing	13%
Government	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,220	1,410	2,630

Employment by Region



Nature of the Job

Library and file clerks record, classify and file publications, correspondence and other materials in offices and libraries. File clerks ensure that accurate information is quickly available to staff in a business or other organization by filing and retrieving letters, forms and other documents. Library clerks maintain a collection of publications or other materiel by ensuring correct placement of items on library shelves and by making entries in the library catalogue system. They assist library users in locating publications and operate the library lending system. Library clerks may be employed in large public and university libraries or smaller specialized libraries and may deal with items such as magnetic tapes or films and recordings. The increasing use of electronic information storage and retrieval systems for business records and library catalogues has created a demand for clerks who are familiar with these systems. Occupations included are library clerk, medical-record librarian, file and classification clerk and tape librarian.

File and library clerks work indoors under good physical conditions. Some climbing, stooping and kneeling is required. File clerks generally work normal office hours on a full-time basis. Library clerks work whenever the library is open; in public libraries this means evening and weekend work may be required. A significant number of library clerks work part-time.

Education and Skills

High school graduation with business and secretarial courses as well as a post-secondary level office program is recommended for those interested in office filing positions. Office administration programs are offered at all community colleges. For those interested in advancing to records officer, Douglas College offers a one year Office Systems and Records Management Program. Applicants must be graduates of the Douglas College Office Administration program or have office experience. People in this occupation should enjoy routine, clearly organized work and attaining precise standards. For more information, see secretary profile (SOC 4111).

Employment as a library clerk usually requires high school graduation and completion of a program in library technology is an asset. Fraser Valley College and Vancouver Community College offer a two year Library Technician Program which prepares graduates for clerical and paraprofessional duties in a variety of library situations. This program is transferable to university Library Science degree programs in B.C. Applicants should be interested in people as well as books and have the ability to deal accurately with details.

B.C. Job Prospects

Three-quarters of all library and file clerks are employed in the education, government, hospital and health services sectors. Employment in this occupation reflects the general trend in clerical occupations in the 1980s. In 1987 employment was 25% lower than 1981 due to the effects of the recession of the early 1980s combined with increasing computerization of records and filing systems. With 1987 employment of 3,810 library and file clerks, this remains a fairly large occupation.

Growth in this occupation is expected to be slower than average to 1995; replacement needs will provide 840 openings for a total of 1,300 openings over the forecast period. These forecasts may be high as computer technology will likely continue to reduce the number of library and file clerks required. However, computer skills will be essential to those employed in the future.

This is a traditional occupation for women and 88% of library and file clerks in 1986 were female.

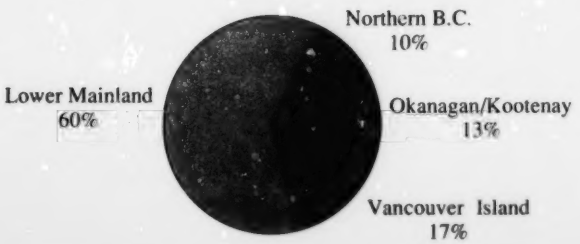
Earnings

The 1986 Census reports that average annual employment earnings in B.C. for full-time full-year workers in this occupation were $18,800.

Related Occupations

Title Searchers, Medical Records Technicians and Mail Clerks .

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,180	3,810	4,270

Annual Growth 1987-1995: 1.4%

Main Industries of Employment 1986 Census

Education	51%
Government	13%
Hospital & Other Health Services	12%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
460	840	1,300

4171 Receptionists and Information Clerks

Nature of the Job

Receptionists greet clients in person or on the telephone, determine their needs, direct visitors or callers to appropriate offices, answer queries, take messages and make appointments. They may perform some clerical duties such as typing, word processing, filing or answering routine correspondence. This occupational group includes admitting clerks, appointment clerks and telephone clerks. This may be considered an entry-level occupation; it offers opportunities to learn the organization of the firm and the type of clients with whom the firm deals. There are possibilities for advancement into secretarial and other administrative positions for those who are willing to pursue further training.

Work is in offices which are clean, well lit and relatively quiet. Although most have regular hours, receptionists and information clerks in hospitals and some professional offices may work weekends or evenings. Most employment is full-year, full-time. However there is a significant component of part-time work and temporary agencies are large employers of receptionists and information clerks.

Education and Skills

Excellent communication skills, an outgoing personality, a positive attitude and a neat appearance are as important as education or experience in becoming a receptionist and information clerk. Some employers prefer a candidate with a high school diploma with courses in English and business skills (typing, bookkeeping), while others might choose a candidate with less formal education but with previous office experience and related experience dealing with the public.

All community colleges offer office administration programs that include receptionist training. Grade 10 or equivalent is mandatory and a strong background in English, spelling and mathematics is preferred. Programs take from three to fourteen months to complete, depending on the program chosen and the skills of the student. Dental Receptionist and Medical Secretary programs are also available at most colleges. For those seeking promotion, advanced courses in office management and business administration are recommended.

B.C. Job Prospects

The employment outlook for this occupation calls for average employment growth of less than 2% per year between 1987 and 1995. This is a similar rate to that of the early 1980s. As this is a very large occupation in B.C., with 14,400 employees in 1987, there will continue to be significant employment opportunities. There are 5,450 openings forecast in the eight years ending in 1995, with 60% of those due to replacement needs. Higher than average growth rates in the early 1980s reflected shifts toward the service and particularly the business and personal service industries, toward public contact as office automation reduced typing/clerical work within offices, and toward smaller firms where the receptionist also performs other duties such as word processing and filing. The shift toward smaller firms and the entry-level nature of this occupation in larger firms mean that persons considering this occupation should prepare themselves with general office administrative skills including keyboard and word processing skills.

The large size and average growth forecast in this occupation are positives for those entering the labour market; relatively low wages and a lack of bridging from the clerical occupations to other areas in most work places are a drawback. This occupation is predominantly composed of women, a situation that has not changed much over the last fifteen years.

Earnings

Monthly starting rates in these occupations are in the range of $1,100 to $1,400 per month and may increase up to $2,500 depending on an individual's experience and the additional duties involved. The higher ends of the ranges are found in unionized work places. The 1986 Census indicates that average employment earnings for receptionists and information clerks in B.C. who worked full-time for the whole year were $17,700.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	13,160	14,400	16,650

Annual Growth 1987-1995: 1.8%

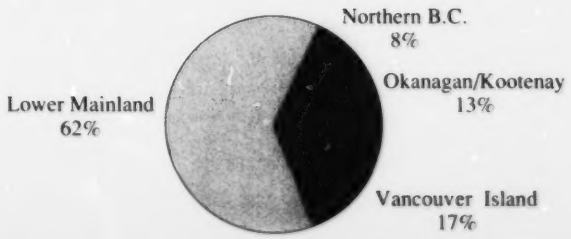
Main Industries of Employment 1986 Census

Services	58%
Trade	9%
Government	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,250	3,200	5,450

Employment by Region



▶ Claims Adjusters 4192

Nature of the Work

A claims adjuster investigates and adjusts claims for loss or damages filed under an insurance policy, determines the company's liability and recommends legal action. Although adjusters may issue cheques to be drawn against company funds, most submit their findings to claims examiners who review the submitted reports, check precedents or similar cases and then authorize payment. This classification includes a variety of skill and responsibility levels from repair clerks to insurance claims adjusters as well as compensation agents. Claims adjusters typically work full-time and the investigative aspect of the job sometimes involves evening and weekend work in order to meet people outside of regular business hours. This work may be stressful as it involves dealing with people who have suffered a loss.

Entry into the occupation of claims adjuster may be through clerical positions in a claims department. However, specialized training is increasingly being required by employers. With experience, a good knowledge of the industry, additional training and the will to study, an adjuster can move up to claims examiner, supervisor or claims manager.

Education and Skills

Most adjusters hired recently have degrees or diplomas in business administration or a closely related field. Preference is given to those with experience in research, decision making or investigation, and two years relevant business experience. Programs in business administration, commerce or economics are offered by all B.C. community colleges and public universities.

Although the Insurance Corporation of B.C. (ICBC) will accept various combinations of education and experience, automobile claims adjuster trainees should have a university degree, or institute of technology diploma, and two years relevant business experience. An entry-level claims representative should have one year acceptable business experience and one year of post-secondary education or completion of at least four Associate of the Insurance Institute of Canada (AIIC) courses. These courses are offered part-time by the Insurance Institute of B.C. in Vancouver. Those who work for smaller adjusting companies must pass a qualifying examination and have sufficient acceptable experience to obtain the required licensing by the B.C. Superintendent of Brokers, Insurance and Real Estate.

Adjusters should like working with detail and evaluating information. In addition, they must be able to make fast decisions and communicate effectively. They must also be imaginative and aggressive, especially when they have to get information from outside sources.

B.C. Job Prospects

The employment outlook for this occupational group calls for slightly lower than average growth over the eight years to 1995. In 1987 there were 980 claims adjusters in the province, down from 1,090 in 1981 due to the effects of the recession of the early 1980s. Over the forecast period, approximately 320 new job openings will become available in B.C., more than 60% of those will be due to retirements and people leaving for other reasons.

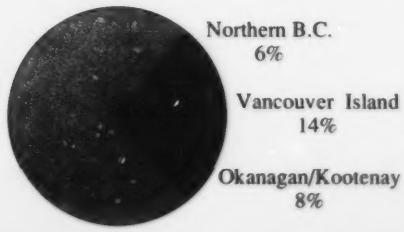
Claims adjusters work in various industries: government, finance, insurance, transportation, retail and wholesale trade, communications and electrical utilities. In 1986, 71% of all claims adjusters were women.

Earnings

Wages in this occupational group are influenced by the nature of work performed and by experience. The 1986 Census indicates average annual employment earnings for a claims adjuster in B.C. of $21,100, and $25,700 for full-year, full-time workers.

A 1986 national salary report conducted by the Metropolitan Life Insurance Company indicated that new claims clerks received an annual salary of $15,500; telephone adjusters received $18,900; senior adjusters received $22,400; and supervisors received $29,600. A claims examiner's annual salary was $21,200; a senior claims examiner received $27,300 a year; a supervisor received $34,900; and a material damage appraiser earned $27,900 a year.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,090	980	1,090

Annual Growth 1987-1995: 1.4%

Main Industries of Employment 1986 Census

Government	32%
Finance, Insurance & Real Estate	21%
Transport. Commun. & Other Utilities	23%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
110	210	320

4193 Travel Clerks, Ticket, Station and Freight Agents

Nature of the Work

Reservation and travel agents are employed by travel agencies, hotels, automobile clubs and airline, railroad, bus and steamship companies. They help people with their travel plans by scheduling itineraries; making reservations and selling transportation tickets; and arranging accommodations. They also check baggage, calculate freight and express-package charges, and handle telephone requests from customers. Some overtime work during evenings, weekends, and during poor weather conditions may be required, and during peak travel periods, they work under tremendous pressure. Ticket agents usually work on rotating shifts with days off.

Education and Skills

Grade 12 is the minimum education required for these occupations, but applicants have a better chance of employment if they have taken a travel and tourism program from schools and colleges accredited by the Canadian Institute of Travel Counsellors (C.I.T.C.). Several B.C. colleges offer a 515 hour accredited Travel Counsellor Program which prepares students to write the C.I.T.C. entry-level examination. Employers usually provide on-the-job training or pre-employment training programs to new recruits, especially ticket agents, for a period varying between two to six months.

Desirable assets for workers in these occupations include a knowledge of other languages, especially French, Japanese and German; strong interpersonal skills; an aptitude for selling; computer skills and a knowledge of the company's reservation system.

B.C. Job Prospects

Job growth in this occupation was below average between 1981-87 and projections to 1995 call for jobs to continue to grow at a slower rate than the average for all other occupations. However, this is a fairly large job group in B.C. with the number of jobs in 1995 expected to be over 4,600. This includes an estimated 1,060 job openings over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. Unemployment figures from 1987 suggest that competition for job vacancies may be quite stiff. Employment patterns in this occupational group tend to be very sensitive to economic conditions.

Travel services could be revolutionized with the introduction of automation integrating numerous travel services. Car rental companies have already automated their reservations and inventory control operations, and computer and networking technology can enable airline passengers to pay both lodging and car rental bills at the airport in one stop. The increased use of electronic equipment may adversely influence the future demand for some categories of ticket agents, such as airline passenger ticket agents.

More and more women in B.C. have chosen this occupation over the last several years, with their representation increasing from 46% to 73% between 1971 and 1986. Opportunities for part-time work are less than in the labour market at large.

Earnings

The average annual employment income of this job group in B.C. was approximately $16,300 in 1986. Over 70% were employed full-time, full-year, and these workers' earnings averaged $22,400.

Current (1989) non-union wages for travel clerks range from $1,000-$1,600 per month. Union wages range from $1,300-$1,600 per month. There is a trend towards travel agents being paid on a commission basis.

Related Occupations

Ground Hosts/Hostesses (Air Transportation), Information Clerks and Receptionists.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,890	4,340	4,640

Annual Growth 1987-1995: .8%

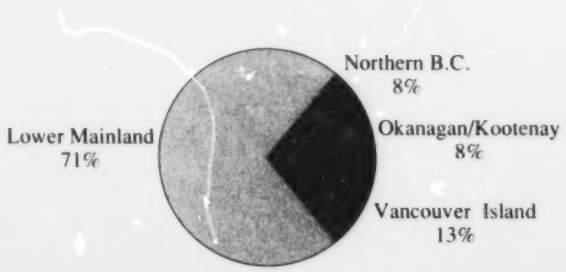
Main Industries of Employment 1986 Census

Misc. Services Related to Transportation	54%
Air Transportation	31%
Water Transportation	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
300	760	1,060

Employment by Region



▶ Hotel Clerks 4194

Nature of the Work
Hotel clerks register guests, assign rooms, transmit and receive messages, keep records of rooms occupied and guests' accounts, make and confirm reservations, check keys and valuables, and present statements to departing guests for payment. In smaller hotels they may act as assistant hotel manager.

Shifts involve night, weekend and holiday work and much of the work is performed standing up.

Education and Skills
Grade 12 is the minimum education requirement for employment as a hotel clerk. Companies provide on-the-job training, which lasts from two to four weeks. Applicants who have completed a Hotel/Motel Management program, available at several B.C. colleges, are at a definite advantage. Those without college training usually start as an information clerk, mail clerk, bellhop or cashier. Some colleges also offer Hotel Front Desk courses that provide basic training for this job.

Hotel clerks should have a neat appearance and the ability to deal with the public. Typing ability often is needed and experience with word processing equipment and computers is a definite asset.

B.C. Job Prospects
Although job growth in this occupation was above average between 1981-87, projections to 1995 call for jobs to grow about as fast as the average, when compared to all other occupations. However, this is a fairly large job group in B.C. with the number of jobs in 1995 expected to be over 2,600. This includes an estimated 920 job openings over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system.

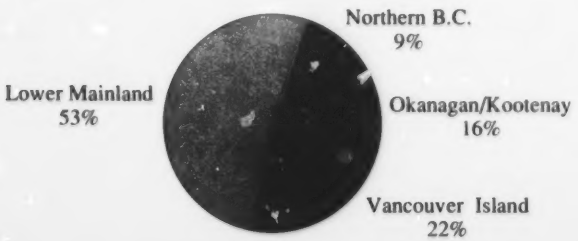
In 1987 unemployment among hotel clerks was well above the average. This reflects the seasonality of this occupation and suggests that competition for job vacancies may be quite stiff. Employment patterns in this occupational group tend to be very sensitive to economic conditions. More and more women have chosen this occupation over the last several years, with their representation increasing from 49% to 65% between 1971-86. When compared to all other occupations, there is above average opportunity for hotel clerks to work part-time and/or part-year.

Earnings
The average annual employment income of this job group in B.C. was approximately $10,200 in 1986. Sixty-five percent were employed full-time, full-year, and these workers' earnings averaged $16,600.

Current (1989) non-union wages for hotel clerks range from $5.00-$10.00 per hour. Union wages range from $9.50-$11.80 per hour.

Related Occupations
Travel Clerks, Receptionists and Information Clerks.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,950	2,330	2,640

Annual Growth 1987-1995: 1.5%

Main Industries of Employment 1986 Census

Hotels & Motels 100%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
300	620	920

Nature of the Work

Administrative clerk, forms control clerk and hospital ward clerk are typical occupations in this group. Office clerks perform clerical duties that range from running errands, delivering messages, receiving callers, handling mail, answering the telephone and filing correspondence, to acting as special assistants in particular departments. In smaller offices, the nature of the work is varied, while in larger offices it tends to be more specialized and repetitive. Most of the work is done at a desk or counter.

By providing the opportunities to acquire experience and additional skills, these jobs offer advancement to more specialized positions, such as accounting clerk or information clerk.

Education and Skills

Although some employers accept less than Grade 12, most prefer applicants with a high school diploma, with courses in business or secretarial science preferred. The three to five month Office Clerk Program offered at B.C community colleges teaches the appropriate work habits (punctuality, adaptability to change) as well as basic office procedures (typing, data entry, record keeping) and requires Grade 10.

Vancouver Vocational Institute offers a six month Hospital Unit Assistant Program which prepares students for employment as a nursing unit clerk and requires Grade 12, plus prerequisite courses in medical terminology and keyboard skills.

Individuals willing to pursue further training and education, such as in business and commerce, will improve their chances of moving up to supervisory positions.

B.C. Job Prospects

Job growth in this occupation was below average between 1981-87 and projections to 1995 call for jobs to continue to grow more slowly than the average for all other occupations. However, this is a very large job group in B.C. with the number employed in 1995 expected to be about 18,250. An estimated 5,580 job openings are expected over the projection period, with the majority resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. In 1987 unemployment was high and well above average, suggesting that competition for job vacancies may be quite stiff.

While the introduction of new office technologies, such as, main frame computers, office purchasing systems and micro-processors, has increased overall office efficiency and individual productivity, it has also altered the nature of some clerical positions. This is expected to have a moderating influence on employment growth.

There is little seasonal variation in employment in this job group, although the rate of part-time employment is above the average for all other occupations. Most general office clerks in B.C. work in provincial and federal government administration, retail trade and hospitals.

Earnings

The average annual employment income of the entire job group in B.C. was approximately $14,200 in 1986. Forty-four percent were employed full-time, full-year, and these workers' earnings averaged $20,700.

In 1989, monthly non-union wages for junior office clerks range from $1,000-$1,500. Union wages range from $1,389-$1,841. The respective figures for senior office clerks are $1,600-$2,100 and $1,650- $2,461.

Related Occupations

Secretaries and Receptionists.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	16,760	16,180	18,250

Annual Growth 1987-1995: 1.5%

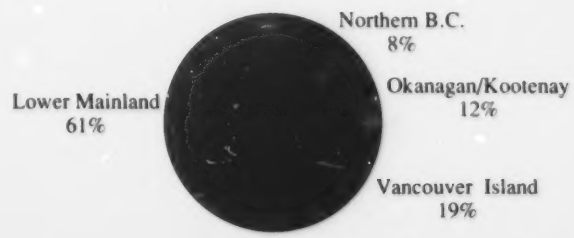
Main Industries of Employment 1986 Census

Government	21%
Retail Trade	11%
Hospitals	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,070	3,510	5,580

Employment by Region



51

Sales Occupations

▶ Supervisors Sales Occupations, Commodities 5130

Nature of the Work
This group encompasses antique dealers, lumber dealers, sales supervisors, wholesalers, importers, exporters and store proprietors. Supervisory positions in sales enable individuals to use their leadership and administrative abilities to plan, organize and coordinate wholesale or retail activities. It includes department managers in supermarkets and department stores as well as chief canvassers in door-to-door magazine sales. Their work includes buying and warehousing merchandise, importing and exporting goods, budget planning, bookkeeping and supervising workers. For the owner-operator or partner, other duties may include inventory control, payroll and management of daily operations.

Education and Skills
These workers are usually selected from employees who have demonstrated leadership qualities and initiative in lower level jobs. The normal requirement is high school graduation and one to ten years in related subordinate positions, depending on the position involved. Completion of a university or community college program in business administration, marketing or merchandising is increasingly important. Four year bachelor degree programs are available at UBC and SFU, and most colleges offer business administration, marketing management, retail management and small business management programs. These are one and two year programs which require Grade 12.

A recent study by Employment and Immigration Canada indicates that as the Canadian population as a whole receives higher levels of education, the demand for similar requirements will occur in sales. While most of the employers surveyed conceded that higher education was not itself necessary for the positions, as customers and clients become better educated and more sophisticated, sales personnel should also develop in the same direction.

B.C. Job Prospects
Although job growth in this occupation was below average between 1981 and 1987, projections to 1995 call for jobs to grow faster than the average for all other occupations. In addition, this is a very large job group in B.C. with the number employed in 1995 expected to be about 17,500. This includes an estimated 5,880 job openings expected over the projection period, with the majority resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. In 1987 unemployment among these workers was lower than average, suggesting that current labour market conditions are more favourable than for most occupations.

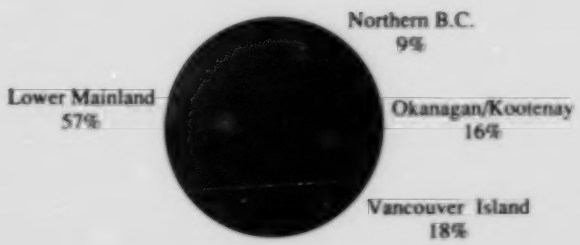
One result of growing disposable incomes has been the shift to smaller, specialized or boutique type of stores, and this is expected to provide a favourable employment climate for occupations associated with these operations.

Opportunities for part-time employment are about average when compared to all other occupations. In B.C., most of these jobs are in retail trade; wholesale trade; and the manufacturing sector. The proportion of women in this occupational group has risen from 18% to 39% between 1971 and 1986.

Earnings
The average annual employment income of this job group was approximately $21,300 in B.C. according to the 1986 Census. Nearly 70% were employed full-time, full-year, and these workers' earnings averaged $25,000.

Related Occupations
Food and Beverage Managers and Branch Managers, Financial Companies.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	15,890	14,920	17,540

Annual Growth 1987-1995: 2.0%

Main Industries of Employment 1986 Census

Retail Trade	74%
Wholesale Trade	13%
Manufacturing	6%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,620	3,260	5,880

Nature of the Work

Sales engineers as well as sales representatives in aircraft, data processing, industrial machinery and medical, dental, agricultural and construction equipment belong in this category. This occupational group is considered among the elite of the sales occupations because it sells scientific and technical products and services varying in nature from chemical, mechanical, electrical and electronic, to light, heat and power. Activities include providing specialized information about the product to architects, engineers, airlines, hospitals and other potential customers as well as providing financial estimates to show cost reduction or increased efficiency resulting from the proposed sale. Technical salespersons are also involved in redesigning the equipment they are selling, according to customers' specifications.

Education and Skills

Good sales ability on its own is insufficient for a successful career in an occupation that requires salespeople to understand the engineering behind their products, as well as the business requirements of their customers. Most employers prefer candidates with a university degree or college certificate in areas pertaining to the products they are selling. For example, a bachelor's degree in computer science, mechanical engineering or electrical engineering is an asset for individuals looking for a sales job in the electronic data-processing industry. BCIT offers an Advanced Technology Marketing specialization within its two year Marketing Management program.

In addition to the formal education requirements, an essential skill in technical sales is that of relating well to people; that is, the ability of persuading and influencing others in favour of a product or point of view.

B.C. Job Prospects

Job growth in technical sales has been well below average since the 1981-82 economic recession, and based on the outlook for wholesale trade and manufacturing, projections to 1995 indicate that employment growth will continue to grow more slowly than the average for all other occupations. This is a medium size job group in B.C. with the number employed in 1995 expected to be about 1,030. This includes an estimated 260 job openings expected over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system.

Although these salespersons are concentrated in the wholesale trade, business services and manufacturing industries, they are associated with an extremely wide range of products and industries. Having employment dispersed through many industries normally tends to moderate fluctuations in employment, but in 1987 unemployment in technical sales was high and well above the average for all occupations. This suggests that competition for job vacancies may be stiff, and that many in the field may also have insufficient technical or marketing skills.

Employment in these occupations has been slightly affected by technological changes. Opportunities are better for sellers of the chemical, mechanical, electrical and electronic products of the technological revolution. The growing interdependence between product/service development, marketing and sales is putting a premium on employment opportunities in this area.

Opportunities for part-time employment are below average when compared to all other occupations. Women's representation in this occupation increased from 2% to 12% between 1971 and 1986.

Earnings

The average annual employment income of B.C. workers in this job group was approximately $32,000 in 1986. Seventy-two percent were employed full-time, full-year, and these workers' earnings averaged $38,300.

Related Occupations

Wholesale and Retail Buyers and Securities Salespersons.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	990	940	1,030

Annual Growth 1987-1995: 1.2%

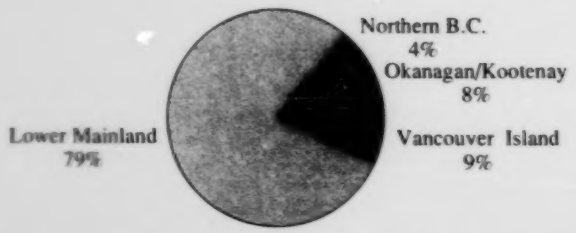
Main Industries of Employment 1986 Census

Wholesale Trade	41%
Business Services	17%
Manufacturing	26%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
100	160	260

Employment by Region



Nature of the Work

These occupations are concerned with selling commodities on a wholesale basis in an allotted geographical area to wholesale, retail, industrial, professional or other establishments. Examples of commercial travellers include sales representatives of computers, food, books, pharmaceuticals, clothing and petroleum products. The salesperson's job is to service existing clients and to secure further customers. Commercial travellers also quote prices, arrange deliveries, resolve customer complaints and keep abreast of the latest product innovations. They must travel in their job and often work evenings and weekends.

Education and Skills

Commercial travellers normally require a minimum of high school graduation, some product and plant experience, and extensive on-the-job training for a period of from six months to two years. Most companies provide extensive sales-oriented training. A community college or university diploma related to the commodity being sold, as well as courses in business, economics and marketing are considered to be assets and may be required for some positions. For example, pharmaceutical representatives normally require college courses in chemistry and biology.

A pleasant personality and the ability to get along well with people are important. Physical stamina is also important because commercial travellers may have to walk, stand for long periods or carry product samples.

A recent study by Employment and Immigration Canada indicates that as the Canadian population as a whole receives higher levels of education, the demand for similar requirements will occur for those employed in sales. While most of the employers surveyed conceded that higher education was not itself necessary for the positions, as customers and clients become better educated and more sophisticated, sales personnel should also develop in the same direction.

B.C. Job Prospects

As a result of the 1981-82 economic recession, there was a large employment loss in this group between 1981 and 1987. Based on the outlook for the wholesale trade and manufacturing sector, projections to 1995 indicate that jobs will grow more slowly than the average for all other occupations. Nevertheless, this is a large job group in B.C. with the number employed in 1995 expected to be about 5,600. This includes an estimated 1,330 job openings expected over the projection period, with the majority resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. The high rate of job turnover also provides employment opportunities additional to those created by growth and attrition.

Unemployment in 1987 was above the average when compared to that of the labour force in general. This suggests that competition for a sales job may be stiff and that many entering this field may not be adequately prepared for the increasing marketing skills required in today's competitive job market. Most commercial travellers in B.C. are employed in the wholesale trade, manufacturing and business services industries.

The incidence of part-time work is less than the average for all other occupations, and this type of work tends not to be affected by seasonal forces during the course of a year. More and more women have chosen this occupation over the last several years, with their representation increasing from 3% to 19% between 1971 and 1986.

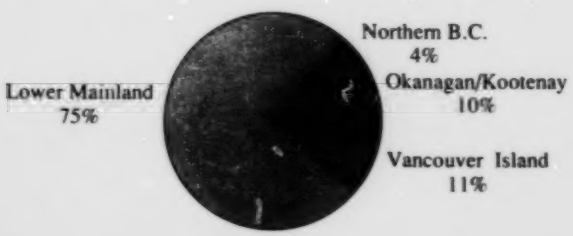
Earnings

The average annual employment income of B.C. workers in this job group was approximately $28,200 in 1986. Seventy-three percent were employed full-time, full-year, and these workers' earnings averaged $32,800.

Related Occupations

Insurance Salespersons and Real Estate Salespersons.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	10,530	5,170	5,570

Annual Growth 1987-1995: .9%

Main Industries of Employment 1986 Census

Wholesale Trade	50%
Manufacturing	41%
Business Services	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
400	930	1,330

Nature of the Work

Commodity sales simply means the sale of products. It includes wholesale as well as retail sales, such as the sales personnel one typically encounters at a grocery store, deli or drug store and when buying new clothes or furniture. It also includes basic parts persons who sell replacement parts and accessories used in the automotive industry.

In selling commodities, sales workers provide direct service to customers and must be knowledgeable about the products they sell. In keeping with customer shopping patterns, they usually work some evenings and weekends.

Education and Skills

These sales jobs do not normally require much formal education, nor much specific training. However, people choosing this occupation must have excellent interpersonal and communication skills. Employers usually look for high school graduates and have experienced sales workers train them on the job. Many of the traditional functions, however, are now done electronically by multi-function cash registers. This equipment enables sales workers to provide better customer service, which requires good product knowledge and marketing skills.

Marketing, sales and business courses are an asset and are offered by all community colleges. For those wanting to advance to senior positions, BCIT offers a specialization in Professional Sales within its two year Marketing Management program. UBC and SFU both have marketing options within their undergraduate business programs.

Several colleges offer entry-level automotive partsperson programs which prepare students for entry-level work in the trade or for the three year Automotive Parts Apprenticeship. There is also a three year Industrial Engines/ Equipment Partsperson Apprenticeship. Those who do not complete a formal apprenticeship must have four years of suitable experience before becoming eligible to write the applicable B.C. Trades Qualification (TQ) Certification exam. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

B.C. Job Prospects

This group enjoyed substantial employment increases between 1981 and 1987, and the projection to 1995 is for employment to grow faster than the average for all other occupations. This is the largest job group in B.C. with the number employed in 1995 expected to be about 97,000. This includes an estimated 14,160 new job openings and 4,420 openings resulting from attrition. In addition to growth and attrition, the high rate of turnover among sales clerks will also produce many job opportunities over the projection period. The labour market conditions prevailing in this occupation have traditionally been slightly better than the average recorded for all occupations, and in 1987 unemployment was below the average for the labour force in general.

General economic conditions can affect employment of salespersons in the retail trade sector. Employment has been influenced by the introduction of electronic cash registers, which has resulted in decreased numbers of sales clerks and hours in large stores. The employment of salespersons, however, has benefited from a major shift to the smaller, specialized or boutique types of store, where customer service is of greater importance.

Many of the job opportunities to 1995 will be part-time employment, as twice the proportion of salespersons work on a part-time basis when compared to the labour force in general. The work is seasonal with employment peaking during the Christmas season. Most of these workers are employed in the retail and wholesale trade industries, as well as the manufacturing sector. In 1986, women represented almost 60% of this labour force.

Earnings

The average annual employment income of this job group in B.C. was approximately $13,100 in 1986. Only 36% were employed full-time, full-year, and these workers' earnings averaged $22,700.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	65,180	82,790	96,950

Annual Growth 1987-1995: 2.0%

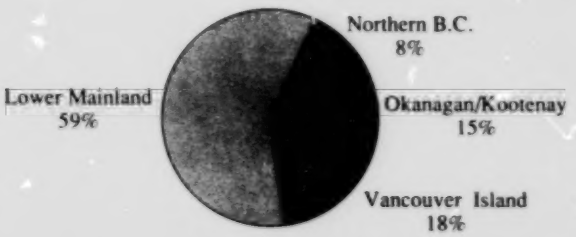
Main Industries of Employment 1986 Census

Retail Trade	70%
Wholesale Trade	15%
Manufacturing	6%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
14,160	4,420	18,580

Employment by Region



Nature of the Work

Insurance sales are familiar to most, since the typical family buys at least some life insurance and car insurance on a regular basis. Less familiar, are sales careers in group and business insurance, which often provide tremendous income potential for successful agents. Annuity representatives, claim inspectors, insurance appraisers and policy writers also fall into this occupational group.

An insurance salesperson's main function is to sell a suitable insurance policy to clients. Other duties include explaining the policy particulars, calculating premiums, drafting contracts and approving insurance applicants.

Their hours of work are usually self-determined, and the nature of work often requires working evenings and weekends. Many work more than 40 hours a week.

Education and Skills

Entry into these occupations normally requires a minimum of high school graduation, a period of from one to four years of on-the-job training, and completion of provincial licensing requirements. Completion of a two year college program in business administration or financial management, or a bachelor's degree in arts, science or business administration is an asset. These programs are available at all B.C. universities and colleges.

A two year diploma program in General Insurance will commence in September, 1989 at Vancouver Community College. This program will have two cooperative education work terms as an integral component. Graduates will receive credit for nine of the twelve courses required for the Associateship Program of the Insurance Institute of Canada.

Licensing for all insurance agents is compulsory in B.C. There are three license classifications with strict requirements. Information on education courses, experience and licensing requirements is available from the Insurance Council of B.C. in Vancouver.

These workers should be enthusiastic and able to communicate effectively. Since they usually work without supervision, they must be able to plan their time well and have initiative to locate new clients.

B.C. Job Prospects

Job growth in this occupation was well above average from 1981-87, and projections to 1995 call for jobs to grow much faster than the average for all occupations. This is a large job group in B.C. with the number employed in 1995 expected to be about 6,600. This includes an estimated 2,500 job openings expected over the projection period, with almost half resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. Almost all insurance salespersons work within the finance, insurance and real estate industry. As an occupational group they are not overly sensitive to economic circumstances.

The introduction of office automation has realigned some of the work tasks performed by insurance agents. The preparation of insurance promotional material, the issuing and processing of premiums, the monitoring of birthdays, and even basic underwriting can now be performed electronically.

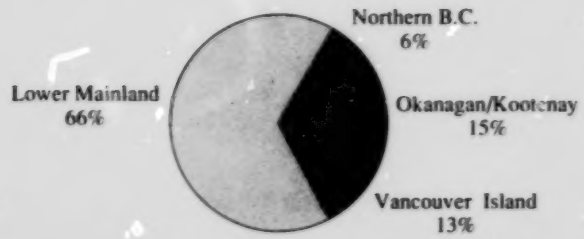
Opportunities for part-time employment are below the average when compared to all other occupations. The representation of women in these occupations has increased from 14% to 40% between 1971 and 1986.

Earnings

Life insurance salespeople are often paid a fixed salary when starting out, with commission sales supplementing their income after some experience is gained. Top-notch salespersons can earn $200,000.

The average annual employment income of this job group in B.C. was approximately $26,000 in 1986. Seventy-one percent were employed full-time, full-year, and these workers' earnings averaged $29,200.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,890	5,380	6,640

Annual Growth 1987-1995: 2.7%

Main Industries of Employment 1986 Census

Finance, Insurance & Real Estate	99%
Provincial Government	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,260	1,240	2,500

5172 Real Estate Sales Occupations

Nature of the Work

Realty appraisers, rental agents, real estate salespersons and agents are typical members of this classification. Real estate salespersons are involved in the selling and leasing of land and buildings. Real estate agents, also known as brokers, have the same responsibilities but have more training and experience, and are licensed to open their own real estate company.

Real estate sales workers spend much of their time away from the office. They must work evenings and weekends, when a large number of sales, especially residential, are accomplished. The introduction of computers and multiple listings has enabled agents to gain wider access to customers and to search through listings quickly to meet customers' needs.

Education and Skills

To sell real estate in B.C. people must pass the B.C. Real Estate Council's required pre-licensing course and the exam that follows. There are several ways to qualify to write the exam. People can complete: a commerce undergraduate program in Urban Land Economics at UBC; a four year UBC diploma course in Urban Land Economics with the Real Estate Management option; a two year diploma course in Real Estate Studies at BCIT; or a Realty Appraisal Program at Vancouver Community College (VCC). After two years experience, licensed salespersons interested in becoming agents may take the agent's pre-licensing course by correspondence.

Employment as an appraiser requires high school graduation plus completion of a program in reality appraisal. VCC offers a two year Realty Appraisal Program and graduates are eligible to write the national certification exams. In addition, the UBC diploma program mentioned above has an appraisal option.

Uncertain incomes and stiff competition aside, realtors must be able to withstand the tension and long hours involved in real estate sales, which is not as glamorous as it might appear. The B.C. Real Estate Association offers an optional aptitude test for anyone thinking of entering the field.

B.C. Job Prospects

Job growth in this occupation was above average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow much faster than the average for all occupations. This is a very large job group in B.C. with the number employed in 1995 expected to be about 13,400. This includes an estimated 6,130 job openings expected over the projection period, with about 3,580 resulting from the need to replace existing personnel who leave.

In 1987, unemployment among these workers was well below the average, suggesting that current labour market conditions are more favourable than for most occupations.

Employment opportunities for real estate salespersons are controlled by economic conditions affecting the housing market, such as the age structure of the population, interprovincial migration and regional prosperity. Offshore buyers have become a significant force in the strong housing and commercial real estate market in the Greater Vancouver area. This is expected to continue, and if current interest rates remain stable, the employment outlook for the real estate sector should continue to be good.

There is more opportunity for part-time work in real estate sales, however, the incidence is less than in the labour market at large. More and more women have chosen this occupation over the last several years, with their representation increasing from 20% to 34% between 1971 and 1986.

Earnings

The average annual employment income of this job group in B.C. was approximately $26,900 in 1986. Sixty-two percent were employed full-time, full-year, and these workers' earnings averaged $32,200.

Real estate agents are paid on a commission basis, usually from 5%-10% of the selling cost, which is divided four ways among the selling broker, selling salesperson, purchasing broker and purchasing salesperson. Commissions are negotiable and tend to be lower on more expensive homes.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	9,960	10,860	13,420

Annual Growth 1987-1995: 2.7%

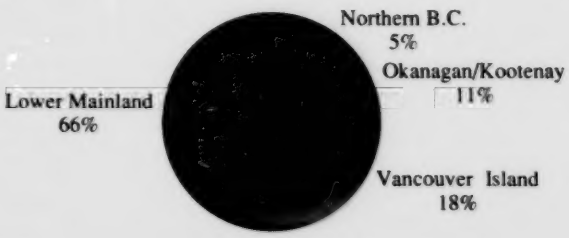
Main Industries of Employment 1986 Census

Finance, Insurance & Real Estate 100%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,550	3,580	6,130

Employment by Region



Nature of the Work

Typical professionals in this occupational group are bond traders, mutual fund sales agents, investment dealers and floor trader. Securities dealers (stock brokers) buy and sell securities on behalf of clients, maintaining files on customer portfolios. They also furnish clients with information on market conditions and on corporations in which investment is contemplated. Their working environment is usually an office. In contrast, floor traders work on the floor of the Vancouver Stock Exchange in fast-paced, high- pressure situations where they must make split-second decisions on buying and selling investments.

Education and Skills

High school graduation is required and a bachelor's degree in business administration or economics is strongly recommended. All community colleges offer first and second year university transfer programs. Entrants to this field must be bondable and complete the Canadian Securities Course, offered by correspondence through the Canadian Securities Institute, Vancouver. The course is open to anyone, not just workers in the securities industry. Registration with the B.C. Ministry of Finance and Corporate Relations is compulsory. To become registered, applicants must be 19 years old; have passed the Canadian Securities Course and the RR (registered representative) exam; and have been employed at least three months full-time by a securities firm.

High energy, a strong desire to succeed and sales ability are vital in these occupations. Self-confidence and the ability to handle rejections are also important.

B.C. Job Prospects

Job growth in securities sales was well above average between 1981 and 1987, and projections to 1995 call for jobs to continue to grow much faster than the average for all occupations. This is a fairly large job group in B.C. with the number employed in 1995 expected to be about 3,600. This includes an estimated 1,400 job openings expected over the projection period, with about half resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. The high job turnover among securities brokers will also create many opportunities additional to those resulting from growth and attrition. In 1987, unemployment was much lower than the average, suggesting that current labour market conditions are more favourable than for most occupations.

Since economic conditions affect the investment and trading climate, they can determine the employment opportunities available to securities dealers working in the finance, insurance and real estate sector. As Canadian banks pursue expansion into global markets and broaden their range of financial services, the demand for banking personnel may increase. Deregulation of the financial industry, as well, may lead to increased competition among banks and other financial institutions and improved opportunities for securities agents and traders.

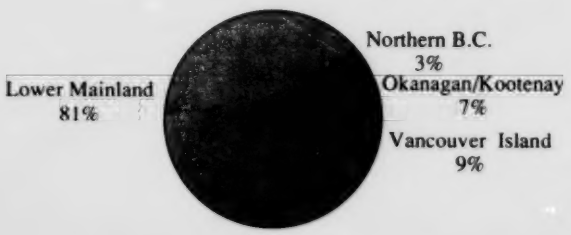
Seasonal forces do not affect employment in this field, and opportunities for part-time employment are about average, when compared to the labour market at large. Most dealers work in Ontario and B.C.

The number of women in this occupational area has increased significantly from 8% to 23% between 1971 and 1986.

Earnings

The average employment income of this job group in B.C. was about $40,100 in 1986. Sixty-five percent were employed full-time, full-year, and these workers' income averaged $48,600.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,960	2,930	3,610

Annual Growth 1987-1995: 2.7%

Main Industries of Employment 1986 Census

Finance, Insurance & Real Estate	96%
Business Services	4%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
680	720	1,400

Nature of the Work
Examples of occupations in this unit are advertising agent, sales representative, advertising broker and time salesperson. They are responsible for soliciting business for display or classified advertising in publications or outdoor advertising. Other aspects include selling art work to advertising agencies or industrial firms for use in advertising material and selling advertising time on radio and television programs.

Education and Skills
The minimum level of education required for advertising salespersons is high school graduation. A diploma from a community college or university program with emphasis on business administration, marketing, economics or merchandising, however, is increasingly demanded by employers. Some previous experience is also desirable.

UBC offers a part-time Marketing and Sales Management Diploma Program. Most B.C. colleges offer marketing management programs. BCIT offers an option in Advertising and Sales Promotion as well as a Marketing and Tourism Management Program.

Advertising salespersons must be well-versed in the operations of the media in which they are selling. Since meeting and discussing options with people is fundamental to their job, they must also be articulate and people-oriented.

B.C. Job Prospects
This occupational group experienced above average employment growth between 1981 and 1987. Current projections to 1995 indicate that jobs will grow about as fast as the average for all occupations. This is a medium size job group in B.C. with the number employed in 1995 expected to be about 1,550. This includes an estimated 400 job openings expected over the projection period, with about half resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system.

In 1987, advertising salespersons' unemployment was lower than average, suggesting that current labour market conditions are more favourable than for most occupations.

Employment opportunities for this occupational group are not particularly vulnerable to prevailing economic conditions. Employment is concentrated in printing and publishing, business services and radio and television broadcasting. The employment outlook depends on continued growth in the advertising field.

Opportunities for part-time employment are less than in the labour market at large. A significantly greater proportion of women have chosen this profession over the last several years, with their representation increasing from 9% to 41% between 1971 and 1986. Nationally advertising salespersons are primarily concentrated in B.C., Quebec and Ontario.

Earnings
A 1986 survey showed that advertising sales and promotion managers' average earnings were $39,400, nationally. The highest earnings were in British Columbia, where the average annual salary was $42,200.

The average employment income of the entire job group was approximately $21,800 in B.C. according to the 1986 Census. Fifty-six percent were employed full-time, full-year, and these workers' income averaged $29,400.

Related Occupations
Insurance Salespersons and Wholesale Trade Salespersons.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,140	1,350	1,550

Annual Growth 1987-1995: 1.7%

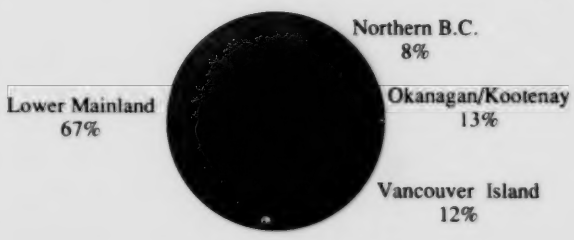
Main Industries of Employment 1986 Census

Printing & Publishing	40%
Business Services	32%
Radio & Television Broadcasting	18%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
190	210	400

Employment by Region



Nature of the Work

Collection-agency salespersons, freight representatives, and hotel service sales representatives are examples of jobs in this occupational classification. Business services representatives sell services such as building maintenance, credit reporting, bookkeeping, security, printing and telecommunications that help to increase the efficiency of an enterprise. They must know their own services well and have a good technical grasp to be able to explain the particular advantages of their services to prospective buyers, and to respond adequately to customers' criticisms or suggestions. Travelling is often required in this job.

Competition in getting a sales job can be stiff, and once there, competition from other companies in the same business and even sales agents in your own firm is a fundamental feature in the nature of sales work.

Education and Skills

Usually individuals move into a sales position after gaining several years of experience in a variety of positions within the company. From one to two years of on-the-job training are required depending on the complexity of the product or service sold. High school graduation is a minimum requirement and completion of a two year community college program or four year university degree in business administration, business management, economics, marketing or merchandising is an asset. Programs are available at all B.C. community colleges and public universities. There are also part-time programs. BCIT offers a Certificate in Professional Sales and UBC offers a part-time Marketing and Sales Management Diploma in cooperation with the Sales and Marketing Executives of Vancouver.

A recent study by Employment and Immigration Canada indicates that as the Canadian population as a whole becomes more educated, similar requirements will occur in sales. While most of the employers surveyed conceded that higher education was not itself necessary for the positions, as customers and clients become better educated and more sophisticated, sales personnel should also develop in the same direction.

B.C. Job Prospects

Job growth in this occupation was well below average from 1981 to 1987, and projections to 1995 call for jobs to continue to grow more slowly than the average for all occupations. This is a small job group in B.C. with the number employed in 1995 expected to be about 660. This includes an estimated 180 job openings expected over the projection period, with most resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. Recent labour market conditions have not been favourable for this occupational area (unemployment in 1987 was above average), suggesting that competition for job vacancies may be quite stiff.

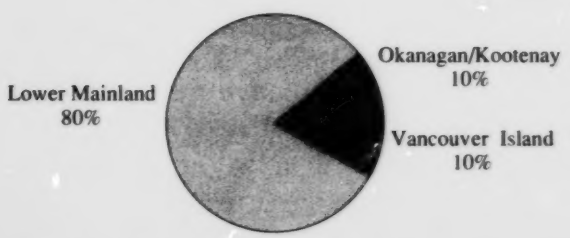
Employment in this category is dependent on economic conditions, as business services salespersons work throughout the industrial spectrum. They are particularly concentrated in the transportation; business services; and finance, insurance and real estate sectors. While the proportion of these salespersons employed in the transportation industry fell from 56% to 23% between 1981 and 1986, the proportion in the finance, insurance and real estate sector has doubled from 8% to 17%. Other increases have been in the telecommunications and printing and publishing sectors.

Work in this field is not seasonal, nor is part-time employment significant. The proportion of women in this occupation has been steadily increasing from 12% to 33% between 1971 and 1986.

Earnings

In B.C. the average employment income of workers was approximately $26,100 in 1986. Sixty-eight percent were employed full-time, full-year, and these workers' income averaged $32,800.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	760	580	660

Annual Growth 1987-1995: 1.6%

Main Industries of Employment 1986 Census

Transportation	23%
Business Services	21%
Finance, Insurance & Real Estate	17%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
80	100	180

61

Service Occupations

▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼

Nature of the Work

This occupational group is primarily concerned with fighting fires and protecting lives and property against fire. Fire-fighters must respond quickly and efficiently to alarms and be able to enter burning buildings using axes, crowbars and door openers. They connect hoses, control ladders, help people to safety and administer first aid. When not extinguishing fires, fire-fighters maintain equipment and respond to other emergency calls, and may administer paramedical aid. Other duties include working on fire prevention and inspection programs, writing reports and keeping up with technological advances. The work in this occupation is dangerous and physically demanding. Conditions include exposure to fumes and hazardous odours.

Fire-fighting is shift work, usually on a four day on, four day off cycle. Most fire-fighters are employed by larger municipalities while some are employed by the federal government at airports, by the provincial government and by harbour commissions. Volunteer fire-fighters in smaller centres work part-time.

Fire-fighters begin as trainees and usually stay with the same department for their entire career. Once fully qualified they may compete for promotional opportunities within their department.

Education and Skills

The minimum education required is usually Grade 12 and preference may be given to applicants who are graduates of community college courses in fire prevention and safety. BCIT offers two courses in fire protection within its part-time Occupational Health Program. The Justice Institute offers a Volunteer Fire-fighter Certificate Program for registered volunteers. Increasingly fire-fighters complete programs in wilderness leadership, available at Capilano College, or criminal justice/criminology, available at SFU and various colleges. A knowledge of first aid and mechanics is also an asset. Formal training of fire-fighters is by the employer and usually lasts six to nine weeks, followed by a probationary period of six to eighteen months.

Applicants must be in top physical condition, including 20/20 vision, pass a medical exam, and have a valid driver's license. Height, weight and other specific requirements vary, so those interested should check with the department they are interested in joining. Among the personal qualities needed are mental alertness, courage and good judgment. Because fire-fighters eat, sleep and work closely together under stressful conditions, they also need to be able to get along well with others.

B.C. Job Prospects

Employment levels depend on government funding in response to demands created by population growth. Employment growth between 1981 and 1987 was at a higher than average rate of 2.5% per year mainly due to the conversion of some volunteer departments to full-time paid departments. In 1987 about 3,900 fire-fighters were employed in B.C., a fairly large occupation. A lower than average growth rate of 1% per year is projected to 1995. The total number of openings predicted for the outlook period is less than 600, about half occurring due to replacement needs. Turnover is very low so retirements account for most replacement vacancies. Many more qualified applicants than required apply in most competitions, therefore, employers can choose the very best.

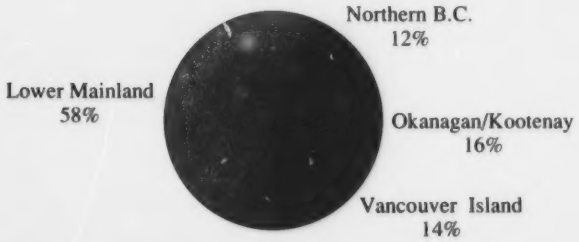
The number of women fire-fighters has increased from none in 1971 to 25 in 1986, representing 1% of all fire-fighters. This proportion should increase in coming years, owing to the recent removal of some recruitment restrictions.

Earnings

Pay ranges vary more in this group than in most because it includes all ranks of fire-fighters from recruits to chiefs. The range for comparable ranks is similar across B.C. The salary for a fourth year fire-fighter in 1988 was $36,900. The starting salary is 70% of the 4th year rate, or $25,800 in 1988. The rate for the rank of captain is 120% or $45,200.

According to the 1986 census, the average employment income for full-time, full-year workers was $35,900.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,340	3,870	4,170

Annual Growth 1987-1995: .9%

Main Industries of Employment 1986 Census

Municipal Government	79%
Provincial & Federal Government	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
300	290	590

Nature of the Work

Police officers are responsible for the protection of life and property, maintenance of public peace, prevention and detection of crime and apprehension of lawbreakers. Police officers patrol assigned areas, investigate accident and crime scenes, direct traffic and give evidence in court. The skill mix of police specialists is increasing, as technical advances continue to affect the scientific methodology used in police work. Detectives are investigative specialists usually dealing with more serious crimes. With the exception of administration officers, police constables work outdoors, often in dangerous situations. The work can be hazardous and police officers are often subject to severe emotional strain. Police work requires attention to detail and extensive report writing. A position as police constable can lead to higher ranks, and to administrative and management jobs.

Police officers work rotating shifts seven days per week. Shifts vary from eight to twelve hours in length. Police officers are subject to call any time their services are needed and may work overtime during emergencies and for court appearances.

In B.C. most police officers are employed either by one of twelve municipal police departments, or by the RCMP. Large municipal departments and the RCMP offer more opportunities for specialist work. Employment with the RCMP may lead to postings in all parts of Canada.

Education and Skills

Grade 12 or the equivalent is the minimum educational requirement and a certificate, diploma or degree in criminology or criminal justice is preferred. One year criminal justice programs are offered at Douglas and Kwantlen colleges and two year criminal justice diploma programs are offered at several colleges. Two year university transfer programs in criminology are also available at various colleges. SFU offers bachelor's and graduate programs in criminology. It also offers certificate programs for undergraduate students and criminal justice professionals as well as an extended studies diploma program for those with a bachelor's degree in any field. While specific qualifications vary between police departments, recruits usually must be 19 years old, with a minimum height of 5ft. 8in. for men and 5ft. 4in. for women; be a Canadian citizen; be able to swim; hold a valid driver's license; and have no criminal record.

Applicants must be physically fit, emotionally stable, have good judgment and a sense of responsibility. They should enjoy serving the public.

B.C. Job Prospects

Employment levels are dependent on government spending on police services which in turn are driven by population size and crime rates. Between 1981 and 1987 growth in this occupation was at an annual rate of 2%, higher than average. Over the forecast period growth is predicted at a rate of less than 1%, much lower than the average predicted for all occupations. In the eight years to 1995 about 830 openings are forecast, about half due to replacement needs. Changing technology, including increased computer use, has been helpful in crime prevention and other police work, but has not affected employment opportunities.

In 1986 there were 545 women working in these occupations representing 8% of all employees. Women, minority groups and, especially in the RCMP, bilingual individuals are actively recruited.

Earnings

All municipal departments offer similar salary ranges; the RCMP has its own salary structure. After completion of three years a police officer normally earns the rank and pay of a First Class Constable. In 1988 this was $37,400 for the municipal forces and $41,100 in the RCMP. Salaries for detectives in 1988 were $44,900 in municipal forces. Ranges for higher ranks increase depending on responsibility, for example to 135% of the first class constable rate for staff sergeants, and more for higher ranks. The 1988 starting rate for a police officer was $28,400.

The average employment income in 1986 in B.C. for full-time, full-year workers was $37,100.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,340	6,040	6,430

Annual Growth 1987-1995: .8%

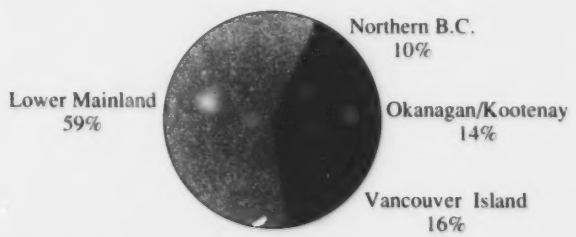
Main Industries of Employment 1986 Census

Federal Government	62%
Municipal Government	30%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
390	440	830

Employment by Region



Nature of the Work

This group includes correctional officers, security guards, watch keepers, plant guards, school-crossing guards and some administrative officers. Corrections officers maintain security and attend to the daily welfare of persons awaiting trial or serving sentences in an institution. They are trained to deal with dangerous situations, use tactical weapons and practice first aid and fire prevention. Their work can lead to more specialized positions and into senior management. Security guards patrol and inspect private property to protect it against fire, theft, vandalism and illegal entry.

The work place may be an industrial plant, shopping centre, bank or a sporting event. They patrol an assigned area, watch for intruders, give information, guide traffic and write reports. Most people in these occupations work shifts. Seasonal variation is not a significant factor. The incidence of part-time work, however, is above the average.

Education and Skills

Security guards need no specific educational qualifications, however high school graduation is recommended. Those with experience in police work or completion of a security program are at a definite advantage. Security guards must have a good knowledge of fire prevention, first aid, building safety and emergency procedures. Self-defense training is also useful. Depending on the position, candidates may also have to be bondable and hold a valid B.C. driver's license. Employers look for people without a police record and who are mature, dependable and have good character references. Guards should be mentally alert, emotionally stable, physically fit, have good hearing and good vision.

Short, part-time security officer programs are offered at BCIT and Vancouver Vocational Institute. In addition to various courses aimed at individuals employed in the retail, public and private security fields, the Justice Institute of B.C. offers a five day Basic Private Security program and an eight day Security Personnel Course.

Several community colleges offer one and two year programs in criminal justice/criminology to prepare students for employment in corrections and private security. Grade 12 or equivalent is the minimum education required for these programs.

B.C. Job Prospects

The employment outlook for this occupational group calls for slower than average growth over the next eight years. This contrasts with the 1970s trend of faster-than-average employment growth. Employment in 1987 was close to 10,000 making this group one of the larger occupations in B.C. Hirings to replace personnel retiring and leaving for other reasons are expected to be above average and will constitute about three quarters of the estimated 5,120 openings in this group in the eight years to 1995.

The business services sector employs 33% of security guards, followed by government employing 28%. Increased awareness of the value of security personnel in reducing vandalism and theft has led to increased employment opportunities in these occupations.

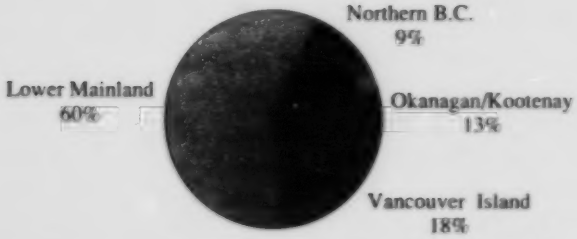
The proportion of women in this occupation has almost tripled since 1971 to 20% in 1986. This trend is expected to continue as more institutions and firms hire women.

Earnings

The 1986 Census indicates that average employment earnings for all workers in this occupation were $15,200, and $23,800 for the 40% of all people who worked full-time for the whole year.

Rates of pay vary in the private security industry depending on the nature of the work and the experience of the individual. Rates of pay for correctional officers in 1987 ranged from $1,925 to $2,321 per month in provincial and federal institutions. Supervisors earned more depending on their level of responsibility.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	7,460	9,760	10,970

Annual Growth 1987-1995: 1.5%

Main Industries of Employment 1986 Census

Business Services	33%
Government	28%
All Other Services	17%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,210	3,910	5,120

6120 Supervisors: Food and Beverage Preparation and Related Service Occupations

Nature of the Work
Supervisors in this classification include cafeteria supervisors, head chefs, head waiters/waitresses and maitres d'hotel. They supervise staff, coordinate service and oversee housekeeping, costs and sales. Experienced people rise rapidly to senior positions.

Work in these occupations can be fast-paced, challenging and complex. Weekend, holiday and shift work is often required.

Education and Skills
Formal preparation for these jobs is becoming increasingly important as B.C.'s food service industry grows in complexity. Several colleges offer a Tourism Supervisor Development Program for those who already have front line experience in food and beverage operations.

Vancouver Community College (VCC) offers a four month Kitchen Management program for experienced cooks. VCC also offers a 21 month Food Services Technician Program which prepares students for technical and/or supervisory work in the field of institutional food service. Several colleges offer a two year diploma program in Hotel/Motel/Restaurant Management.

Applicants to these programs should be good communicators and people-oriented.

B.C. Job Prospects
Although job growth in this occupation was above average between 1981and 1987, projections to 1995 call for jobs to grow about as fast as the average, when compared to all other occupations. However, this is a large job group in B.C. with the number of jobs in 1995 expected to be almost 8,200. This reflects an estimated 2,130 job openings over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system.

The growth of more sophisticated and better quality hotels in B.C. will provide opportunities for career positions in this field. These supervisory positions require highly skilled employees. In 1987 unemployment in this occupational group was below average, suggesting that current labour market conditions are more favourable than for most occupations.

The main industries of employment for these workers are accommodation and food services; hospitals; and retail trade. Employment in this occupational group tends to be sensitive to economic conditions. There is average part-time work available and little seasonal variation, when compared with other occupations. In 1986, women made up over 51% of this work force.

Earnings
The average annual employment income of this job group was approximately $15,300 in 1986. Fifty-three percent were employed full-time, full-year, and these workers' incomes averaged $19,600.

Related Occupations
Tourism Managers and Sales Representatives.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	6,830	7,220	8,160

Annual Growth 1987-1995: 1.6%

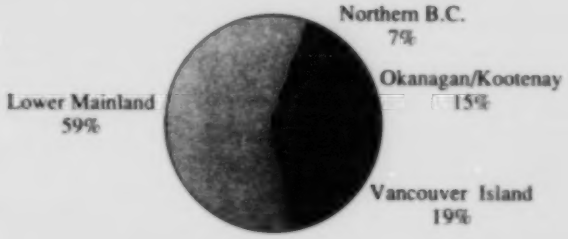
Main Industries of Employment 1986 Census

Accommodation & Food Services	81%
Hospitals	6%
Retail Trade	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
940	1,190	2,130

Employment by Region



Nature of the Work

Chefs and cooks are largely responsible for a restaurant's reputation. While most items on a menu are prepared by cooks, the chef is responsible for managing the kitchen and staff and prepares only the specialty dishes of the restaurant. This field also includes persons who prepare food in restaurants that emphasize fast foods. Such jobs require only limited cooking skills. Besides restaurants, chefs and cooks work for hotels, caterers, clubs, tourist resorts, cruise ships, and institutions.

Opportunities are good for cooks to advance to chef positions or supervisory positions, particularly in hotels, clubs or larger restaurants. Hours usually include evening, holiday and weekend work.

Education and Skills

Although many cooks and chefs start out as dishwashers, those who have vocational training have an advantage when looking for jobs in large restaurants and hotels, where hiring standards are high. B.C. colleges offer a one year Cook Training Program which prepares students for entry-level work in the trade or to proceed on to the Cook Apprenticeship which lasts three years and includes four weeks of in-school technical training each year. Those who have taken the entry-level trades program mentioned above receive Level 1 technical training credit.

Although a minimum Grade 10 education is mandatory, apprenticeship employers prefer applicants with Grade 12, including English 12. Those who have not completed an apprenticeship can apply to write the B.C. Trades Qualification (TQ) examination after four years of suitable experience. Vancouver Vocational Institute also offers Chinese and Japanese Cuisine programs.

About eight to fifteen years experience as a cook is required to become a fully qualified chef.

B.C. Job Prospects

Compared to all other occupations, job growth in this occupational group was above average between 1981 and 1987, and is expected to continue to grow about as fast as the average into the mid-90s. An increase of almost 3,000 new jobs are expected between 1988-95 and job openings resulting from replacement or attrition needs are estimated to be 3,690 for the period, so that by 1995 this occupation is expected to employ more than 25,200 workers in B.C. Cooks and chefs are the ninth largest job group in the B.C. economy. With turnover rates more than six times that of other industries, numerous job openings are created each year additional to those resulting from growth and attrition.

The main industries of employment for chefs and cooks are accommodation and food services; hospitals; and retail trade. The best opportunities for the better paying, full-time, year-round career positions are projected for those who have the higher skill levels needed in B.C.'s increasingly sophisticated tourism and hospitality industry.

Despite the demand for well qualified staff, unemployment rates among cooks and chefs are fairly high. This reflects the seasonal variation of this occupation as well as the number of cooks who do not have the necessary skills required in today's competitive job market. Consumer preference for restaurants that offer more exotic and expensive foods requires highly skilled cooks and chefs.

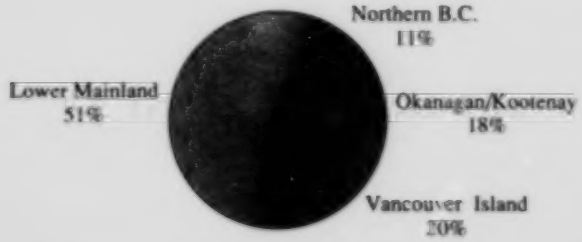
There is above average part-time work, primarily among cooks. In 1986, women made up 46% of this labour force.

Earnings

The high rate of seasonal and part-time work among these workers is reflected in the average annual earnings of approximately $9,100 in 1986. Only 29% were employed full-time, full-year, and these workers' earnings averaged $15,200.

Current (1989) hourly wages for chefs are $7.50-$14.00 (non-union) and $11.04- $14.30 (union). The respective figures for cooks are $5.50-$11.25 and $6.50- $12.50 per hour, and for cooks' helpers $4.50-9.00 and $4.50-$11.00.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	17,710	22,290	25,260

Annual Growth 1987-1995: 1.6%

Main Industries of Employment 1986 Census

Accommodation & Food Services	81%
Hospitals	7%
Retail Trade	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,970	3,690	6,660

Nature of the Work

Bartenders fill drink orders that waiters and waitresses take from customers in the restaurant or lounge, as well as orders from customers seated at the bar. Bartenders must know dozens of drink recipes and, by sight alone, be able to mix drinks accurately and quickly. Bartenders also collect payment, operate the cash register, clean up after customers have left, and are responsible for maintaining an inventory of liquor, mixes and other bar supplies. Friendly conversation with the customers is expected and weekend work and split shifts are common.

Education and Skills

Private schools and several community colleges offer a 60-90 hour bartending program which provides training in the knowledge and skills required to work effectively in a bar or lounge. For those wanting to advance, completion of the hotel/restaurant management or the dining room and lounge supervisor college programs are an asset.

Bartenders must be 19 years old, and although there is no minimum education requirement, Grade 10 is preferred. Bartenders should have a pleasant personality and a neat and clean appearance. They must have the ability to exercise good judgment. Stamina and strength also are necessary, because they stand while working and may be required to lift heavy kegs of beer or cases of beverages.

B.C. Job Prospects

Although job growth in this occupation was above average between 1981 and 1987, projections to 1995 call for jobs to grow about as fast as the average, when compared to all other occupations. This is a large occupational group in B.C. with the number of jobs in 1995 expected to be about 5,370. This includes an estimated 1,310 job openings expected over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to undertake other education. Turnover is high in these jobs and creates numerous job openings additional to those resulting from growth and attrition.

Unemployment among bartenders is very high. This reflects considerable competition as well as seasonality of employment. Many unemployed do not have the necessary skills or attitudes for this employment. As the B.C. tourism and hospitality industry becomes increasingly sophisticated, those bartenders with higher skill levels will have the best opportunity in gaining the better paying, full-time, year-round career positions.

Employment patterns in this occupational group tend to be very sensitive to economic conditions. In B.C., the main industries of employment for bartenders are accommodation and food services; miscellaneous services; and recreation. More and more women have chosen this occupation over the last several years, with their representation increasing from 5% to 56% between 1971 and 1986. There is above average part-time employment available in bartending.

Earnings

The average annual employment income of bartenders in B.C. was approximately $10,800 in 1986. Only 34% were employed full-time, full-year, and these workers' earnings averaged $16,100.

Current (1989) non-union wages for bartenders in the Vancouver area range from $5.00-$10.00 per hour. Union wages range from $10.35-$11.45 per hour.

Related Occupations

Short-order Cooks, Food Counter Workers and Waiters/Waitresses.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,980	4,790	5,370

Annual Growth 1987-1995: 1.4%

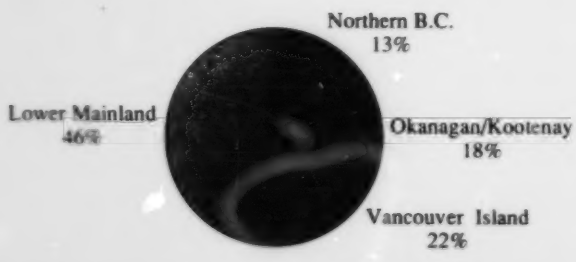
Main Industries of Employment 1986 Census

Accommodation & Food Services	80%
Miscellaneous Services	11%
Recreation	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
580	730	1,310

Employment by Region



Nature of the Work

The quality of service a dining room or cocktail waiter/waitress, counter person or bus person delivers has a lot to do with whether a customer is likely to return to an establishment. The majority of these workers are employed part-time, and this flexibility in scheduling is attractive to many students, homemakers and retirees. Most are expected to work evenings, weekends and holidays, and some work split shifts. This means working for several hours, taking a few hours off and then returning to the job. Waiters and waitresses are continuously on their feet and have to carry heavy trays of dishes and food.

Waiters and waitresses may move into several occupations, for example, bartender, food and beverage manager, banquet supervisor or restaurant, resort or hotel manager.

Education and Skills

There are no specific education requirements for waiter and waitress jobs, although many employers prefer high school graduates. Completion of a two to three month waiter/waitress training program is an asset. This program is offered by BCIT and several B.C. colleges and requires Grade 10 or mature student status. Douglas College offers a Restaurant Work Program for students with special learning needs and Malaspina College has one for special needs adults. Those restaurants with a complex level of service usually require vocational training as well as previous experience as a counter person, bus person or kitchen helper.

Waiters and waitresses should enjoy dealing with all kinds of people. They need stamina, a good memory, and basic arithmetic. A medical certificate and TB test is compulsory.

B.C. Job Prospects

Waiters/waitresses and other food and beverage workers are the fourth largest job group in the B.C. economy and by 1995 are expected to employ 40,150 persons, an increase of 4,650 new jobs. Compared to all other occupations this is an average expected growth rate, but as the B.C. tourism and hospitality industry becomes increasingly sophisticated, those waiters and waitresses with higher skill levels will have the best opportunity in gaining the better paying, full-time, year-round career positions. Attrition will generate another 4,300 jobs to 1995 and the high turn-over rate among the less skilled workers means there will be many job openings through the mid-90s. Also contributing to the demand for workers in this occupation are rising personal incomes which allow people to eat out and take vacations more often as well as dual career families for whom eating out is always a welcome convenience.

Despite the demand for well qualified staff, there is higher than average unemployment. This reflects, in part, those who do not have the necessary skills required in today's competitive job market. There is above average part-time work available and at the time of the 1986 Census, almost 80% of this work force were women.

Earnings

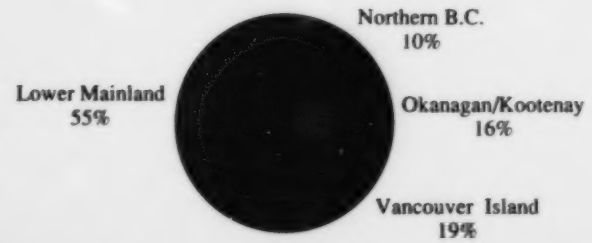
The seasonal nature and high rate of part-time work in this occupation are reflected in the average annual earnings, which in B.C. were about $5,600 in 1986. Only 15% were employed full-time, full-year, and these workers' earnings averaged $12,500.

Current (1989) hourly wages for waiters and waitresses range from $4.50-$8.50.

Related Occupations

Flight Attendants, Bartenders and Dining Room and Lounge Supervisors.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	29,880	35,500	40,150

Annual Growth 1987-1995: 1.6%

Main Industries of Employment 1986 Census

Accommodation & Food Services	88%
Retail Trade	3%
Recreation	2%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
4,650	4,330	8,980

6130 Supervisors: Occupations in Lodging and Other Accommodation

Nature of the Work

This occupational group includes occupations concerned with supervising and coordinating the activities of workers engaged in cleaning and servicing apartment houses, guest rooms in hotels, motels and tourist homes, trailer parks, office buildings and other lodging facilities. It also includes baggage handling in these establishments.

Since most office buildings are cleaned while they are empty, evening work may be required. When there is a need for 24-hour maintenance, shift work may be required.

Education and Skills

For these supervisory positions, a Grade 12 education is preferred, with one to five years experience in related subordinate positions or on-the-job training. Workers are usually selected from employees who have demonstrated leadership qualities and initiative in lower level jobs. They may receive formal training in such subjects as business management, job relationships and job instruction training from their employers. Several colleges offer a Tourism Supervisory Development Program which have courses in these fundamental subjects. Colleges offering an Accommodation Specialty, provide additional training in hotel/motel supervision. The program is open to those who already have experience working in a front line capacity in the tourism field. Camosun, Malaspina and Vancouver Community College (VCC) offer a two year Hotel and Restaurant Administration program which prepares students to eventually move into supervisory positions. Students must have completed Grade 12 with Algebra 11 and English 12. VCC also offers a Building Manager (Residential) Certificate Program through its Continuing Education Division.

These supervisors need good organizational skills to expedite work activities as well as communication skills to comprehend reports and to effectively communicate with superiors and subordinates.

B.C. Job Prospects

Job growth in this occupation was well above average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow faster than the average for all other occupations. This is a fairly large job group in B.C. with the number of jobs in 1995 expected to be more than 8,700. This includes an estimated 5,250 job openings expected over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system.

In 1987 unemployment was below average, suggesting that current labour market conditions for this occupational group are more favourable than for most occupations. The two main industries of employment for these workers in B.C. are accommodation and food services and finance, insurance and real estate. Employment patterns for these occupations are sensitive to economic conditions. In 1986 women made up 63% of this work force. Opportunities for part-time work are greater than in the labour market at large.

Earnings

The average annual employment income of this job group in B.C. was approximately $12,300 in 1986. Forty-eight percent were employed full-time, full-year, and these workers' earnings averaged $16,100.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,460	7,390	8,740

Annual Growth 1987-1995: 2.1%

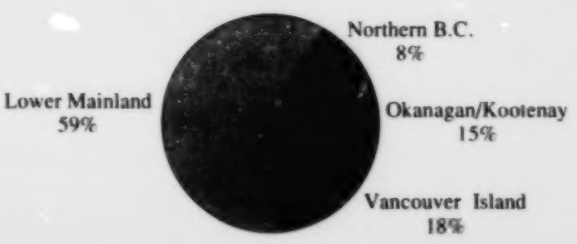
Main Industries of Employment 1986 Census

Accommodation & Food Service	51%
Finance, Insurance & Real Estate	49%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,350	3,900	5,250

Employment by Region



▶ Lodging Cleaners (except Private Household) 6133

Nature of the Work
These occupations, which include chambermaids and housemen, perform routine housekeeping tasks in hotels, motels, tourist homes and other lodging facilities. Their work includes cleaning rooms and arranging furniture as well as the more repetitive and tiring tasks of scrubbing and waxing floors or making up beds.

Education and Skills
Grade 10 is the minimum education preferred for employment as a house cleaner or room cleaner in hotels, motels and tourist courts. Training is on-the-job and lasts up to thirty days. Experienced workers with supervisory potential may eventually advance to executive housekeeper.

These workers need strength to move heavy furniture and physical ability to stoop, kneel, crouch and reach while cleaning. They should also be able to follow instructions and work well on their own.

B.C. Job Prospects
Although job growth in this occupation was well above average between 1981 and 1987, projections to 1995 call for jobs to grow about as fast as the average for all occupations. However, this is a large job group in B.C. with the number of jobs in 1995 expected to be almost 5,800. This includes an estimated 1,860 job openings expected over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. Turnover is very high in these jobs and creates numerous job openings additional to those resulting from growth and attrition.

Unemployment was high and well above average in 1987, reflecting the seasonality of this occupation. Employment patterns in this occupational group tend to be very sensitive to economic conditions. In B.C., employment is found primarily in the accommodation and food services industry as well as in hospitals.

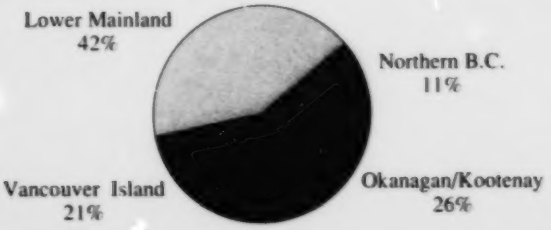
Ninety-five percent of these jobs were held by women in 1986 and opportunities for part-time work abound.

Earnings
The average annual employment income of this job group was approximately $6,800 in 1986. Only 17% were employed full-time, full-year, and these workers' incomes averaged $14,000.

Current (1989) non-union wages for chambermaids range from $4.50-$9.00 per hour in the Vancouver area. Union wages range from $8.98-$9.68 per hour.

Related Occupations
Private Household Workers, Gardeners and General Maintenance Repairers.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,850	5,090	5,760

Annual Growth 1987-1995: 1.6%

Main Industries of Employment 1986 Census

Accommodation & Food Services	86%
Hospitals	10%
Education	2%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
670	1,190	1,860

6143 Barbers, Hairdressers and Related Occupations

Nature of the Work

This group includes beauticians, cosmetologists, hair cutters, electrologists, make-up artists, and specialists in tinting and perming. They may provide many different creative services, including cutting, shaping, coloring, and curling hair as well as facial treatments and manicures. Also included are owners and managing supervisors of establishments providing these services.

The work is manual and requires endurance as these workers are constantly on their feet. Evening and weekend work is usually required. People remaining in the occupation often open shops of their own.

Education and Skills

There are two methods of becoming a hairdresser or barber in B.C. The first is to complete a 1,500 hour entry-level trades training program in either Hairdressing or Men's Hairstyling. These are offered at several community colleges, although 90% of students are trained in private institutions. After completion, the student must write a licensing exam administered by either the Hairdressers' or Barbers' Association, followed by approximately six months on-the-job training in a salon. The student is then eligible to qualify for licensing.

The second method of becoming a hairdresser or barber is to enter into a two year apprenticeship agreement with a salon that can provide provincially acceptable on-the-job training. Upon completion of this term, apprentices must write the licensing exam mentioned above. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Vancouver Vocational Institute offers an 800 hour Esthetics (Skin Care) Program which requires Grade 10. This program trains students to be esthetician technicians, cosmetic company representatives and make-up artists.

Those considering eventual ownership of their own operation should have a knowledge of business and bookkeeping techniques.

B.C. Job Prospects

Job growth in this occupation was well above the average from 1981-87 and projections to 1995 call for jobs to continue to grow faster than the average for all occupations. In addition, this is a very large job group in B.C. with the number employed in 1995 expected to be almost 15,900. This includes an estimated 2,700 new job openings and 2,530 replacement opportunities expected over the projection period. Turnover is high in these jobs and creates numerous job openings additional to those resulting from growth and attrition. Unemployment is low when compared to that of the labour force in general.

Employment opportunities for this job group are concentrated in large to medium urban areas, and cities offer the best opportunities for growth and specialization. A steady demand for hairstylists should result from the increased popularity of hairstyling and cosmetic treatment for men.

Employment is concentrated in the personal services industry, and to some extent in retail trade. Changes in the business cycle have little effect on this group. Employment is often self-employment or is tied to the capacity to attract repeat clientele. Part-time work is more common than in other occupations. Most of these workers are women (81% in 1986).

Earnings

Earnings are based on 40% to 50% commission with a guaranteed minimum hourly rate, depending on experience.

The average annual employment income of this job group in B.C. was approximately $10,700 in 1986. Forty-one percent were employed full-time, full-year, and these workers' income averaged $15,300.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	10,250	13,170	15,870

Annual Growth 1987-1995: 2.4%

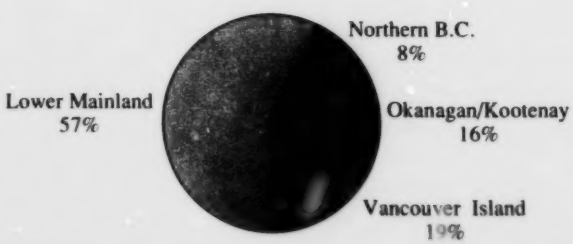
Main Industries of Employment 1986 Census

Personal Services	94%
Retail Trade	4%
Hotels	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,700	2,530	5,230

Employment by Region



Nature of the Work

Included in this group are building operators, sanitation engineers, superintendents and floor cleaners. A janitor maintains a building, handling emergencies and scheduled preventive maintenance, grounds keeping, housekeeping, inventory control and sometimes administrative duties, such as rent collection and leasing. Supervising may include the hiring and training of staff.

Many people in these occupations are on call at all hours of the day. Because they are in contact with the public, these workers should be courteous, tactful and neat. They must also be aware of health, safety and sanitation regulations.

Education and Skills

There are no specific education requirements, although one to two years of high school is preferred. While most workers receive about one month of on- the-job training, there is an increasing demand for skilled employees.

Vancouver Vocational Institute offers a twelve week Building Service Worker Program that trains students to work as janitors or cleaners. Admission requirements include Grade 10 or the equivalent, and a recent TB test report. Vancouver Community College's Continuing Education Division offers a Building Manager (residential) Certificate Program.

Because the tasks of janitors are quite varied, a knowledge of electrical, plumbing, carpentry and other construction skills is a strong asset.

B.C. Job Prospects

Job growth in this occupation was below average between 1981 and 1987 and projections to 1995 call for jobs to continue to grow more slowly than the average for all other occupations. However, this is one of the largest job groups in B.C. with the number employed in 1995 expected to be over 26,000. This includes an estimated 9,270 job openings expected over the projection period, with most of them resulting from the need to replace existing personnel who leave because of death, retirement or to return to the household or educational system. In 1987 unemployment was about average, suggesting that competition for jobs is vigorous but not hopeless.

The majority of these workers are employed in miscellaneous services, educational institutions and hospitals. They also work in the manufacturing sector and government. Consequently, the employment of janitors may fluctuate according to the general business climate.

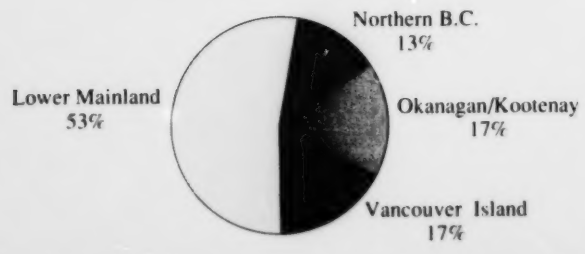
While changing technology in the work place has been helpful to janitors in their work, it has not had any resulting effect on employment. There is more part-time work than in other occupations, but jobs are not seasonal. Women's representation in this work force has increased from 32% to 45% from 1971-86.

Earnings

The annual employment income in B.C. of this job group averaged $11,400 in 1986. Only 33% were employed full-time, full-year, and these workers' income averaged $19,400.

Current (1989) non-union wages for janitors (light duty) range from $4.50- $9.50 per hour. Union wages range from $6.70-$14.00 per hour. The respective figures for janitors (heavy duty) are $7.00-$12.00 and $10.00-$14.00.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	24,170	23,730	26,300

Annual Growth 1987-1995: 1.23

Main Industries of Employment 1986 Census

Miscellaneous Services	26%
Education	20%
Hospitals	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,570	6,700	9,270

71

Farming, Horticultural and Animal Husbandry Occupations

▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼

▶ Livestock Workers 7183

Nature of the Work
This classification includes occupations which attend to livestock, such as cattle and horses. Activities include feeding and watering animals; breaking, training and exercising racehorses and draft horses; shoeing horses; beekeeping; milking cows, and cleaning and disinfecting milking equipment; mixing and spraying disinfectant and herbicide solutions; dehorning and branding cattle; and caring for poultry. On farms that raise animals for meat or dairy products, work goes on constantly throughout the year.

Education and Skills
There are no specific education requirements for employment in these occupations. Generally, training is on-the-job and lasts from three months to one year. A knowledge of farming and farming techniques and an aptitude for mechanics are all considered assets. Livestock farm workers should have physical strength and stamina as the job requires lots of heavy lifting, bending and stretching.

Fraser Valley College and Northern Lights College offer agriculture programs with courses of study in livestock production, general agriculture, animal care and farm or ranch practices.

Malaspina College offers a six week Apiculture (beekeeping) Program designed to train beekeepers in the skills needed to work in a commercial apiary or to be self-employed. There are no prerequisites and the program takes place in February and March, as beekeepers usually hire in April.

BCIT and Northwest Community College offer an eight week course for those wanting to become Certified Pesticide Applicators.

Of related interest is the 12 week Farrier Program available at Kwantlen College. Admission requirements to the Farrier program are physical strength and stamina, as well as horse handling experience.

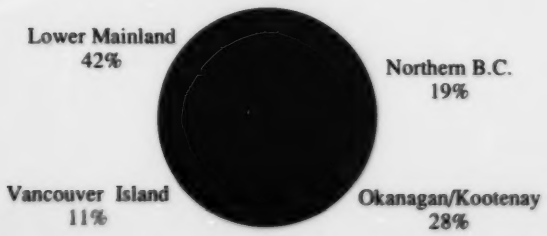
B.C. Job Prospects
Job growth in this occupation was well above average between 1981 and 1987 and projections to 1995 call for jobs to grow faster than the average for all other occupations.

In addition, this is a fairly large job group in B.C. with the number employed in 1995 expected to be about 4,220. This includes an estimated 680 new job openings and 900 replacement opportunities expected over the projection period.

Dairy workers are frequently in demand, above available supply. Employment in this job group is affected by general economic conditions as well as environmental conditions (weather, soil erosion). In 1986, women made up 40% of this labour force. The rate of part-time employment in these occupations is three times higher than the average for all other occupations.

Earnings
The average annual employment income of those in this job group in B.C. was approximately $8,600 in 1986. Only 33% were employed full-time, full-year, and these workers' earnings averaged $15,100.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,190	3,540	4,220

Annual Growth 1987-1995: 2.2%

Main Industries of Employment 1986 Census

Agriculture 100%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
680	900	1,580

Nature of the Work

Greenskeepers, landscape gardeners, flower growers and grounds maintenance workers are all part of this group, in addition to nursery workers. Nursery workers plant, cultivate and harvest trees, shrubs, ornamental and flowering plants in greenhouses, nurseries and on grounds. Their duties include preparing soil, transplanting plants, grafting, spray watering and pruning plants, trees and shrubs, as well as pesticide application. Most of the work is manual, requiring considerable bending, stooping, kneeling and lifting. In a number of cases, a nursery worker may be required to work with the public, providing information and advice to customers and assisting them in the selection and purchase of products.

People remaining in the occupation often open companies of their own. Those considering eventual ownership of their own operation should have a knowledge of business management and bookkeeping techniques.

Education and Skills

There are no specific education requirements for employment in these occupations. Training is on-the-job and lasts from three to twelve months. Completion of a ten month community college program in horticulture is an asset. Admission requirements include Grade 10, or the equivalent. Several colleges offer a Horticulture Technician Program that covers both landscape maintenance and greenhouse/nursery work. BCIT offers a two year Landscape Maintenance Program, and Malaspina College offers a Greenhouse Worker Program and a Landscaping Assistant Program for special needs adults. BCIT and Northwest Community College offer an eight week course for those wanting to become Certified Pesticide Applicators.

For those wanting to become tree surgeons (arborists), BCIT offers a 20 day Tree Trimmer Trade Program. Graduates of the program must complete 1,200 hours of supervised climbing and trimming near energized lines. This entitles trainees to write the certification exam required for employment with B.C. Hydro or with contractors who work for B.C. Hydro. Admission requirements include two months experience in tree trimming or completion of the Forestry Crewperson Program available at several community colleges.

B.C. Job Prospects

Based on expected growth in construction, government administration and agriculture, and on residential and commercial interest in both indoor greenery and landscaping, projections to 1995 call for jobs in nursery work to grow faster than the average for all other occupations. This above average employment growth is a continuation of the situation between 1981 and 1987. Nursery propagation of young trees for silviculture adds to the demand for these workers. In addition, this is a very large job group in B.C. with the number employed in 1995 expected to be about 13,800. This includes an estimated 2,320 new job openings and 2,520 replacement opportunities expected over the projection period. When compared to that of the labour force in general, unemployment was above average in 1987, suggesting that competition for job vacancies may be quite stiff.

A great many of these jobs are part-time. Employment is also highly seasonal with employment peaks occurring during the warm weather months (only one in five nursery jobs were full-time year-round in 1986). However, only employment related to the landscaping of newly constructed sites is sensitive to changing economic conditions for construction. Overall employment has been little affected by changing technology. The number of women becoming nursery workers has been steadily increasing from 6% in 1971 to 23% in 1986.

Earnings

The average annual employment income of those in this job group in B.C. was approximately $10,000 in 1986. Only 19% were employed full-time, full-year, and these workers' earnings averaged $21,600.

In 1989, non-union wages for nursery workers in the Vancouver area range from $4.50-$7.50 per hour. Union wages range from $8.00-$10.00 per hour.

Related Occupations

Landscape Architects.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	8,580	11,450	13,770

Annual Growth 1987-1995: 2.3%

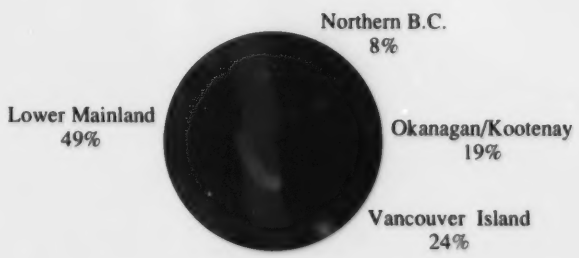
Main Industries of Employment 1986 Census

Construction	31%
Government	17%
Nurseries	15%

Estimated Job Openings in B.C. 1987-95

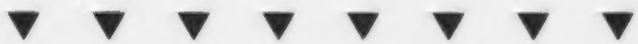
Growth (Net)	Attrition	Total
2,320	2,520	4,840

Employment by Region



73

Fishing, Trapping and Related Occupations



▶ Captains and Other Officers, Fishing Vessels 7311
Crew, Fishing Vessels 7313

Nature of the Work

Captains or skippers of fishing vessels determine where a vessel fishes, navigate vessels and oversee fishing operations at sea. On the west coast most captains/skippers operate their own vessels with crews of up to four on larger vessels.

Currently the B.C. fishing fleet is composed of vessels ranging in size from under ten tons to over 60 tons. About 60% of the fleet is represented by small gillnet, troll or combination troll/gillnet and crabber boats usually operated by one or two persons. Chartering and guiding for sport fishing is another well established fishing related industry in B.C. Employment may be full or part-time and is highly seasonal with peak employment during the summer months.

Salmon is the largest fishery on the B.C. coast. Herring, halibut, groundfish and invertebrate species such as crabs also are important.

Education and Skills

Fishing vessel officers are usually over 19 with a minimum of Grade ten and must be certified by the Ship Safety Branch, Canadian Coast Guard, Transport Canada. Certificates are gained through education as well as work experience. Five to eight years of on-the-job experience are required to be a captain or master and two to four years of on-the-job training are usually required to be a ship's mate. Completion of a program at a community college or school of fisheries is recommended.

The Pacific Marine Training Institute in North Vancouver and Camosun, Malaspina, North Island and Northwest Community Colleges offer Nautical Training Programs designed for people working in the marine industry who want to prepare for various Department of Transport certification examinations. Both the lengths of modules and the programs vary from a few days to 31 weeks. Self-paced and self-study options are also available. Applicants must be eligible to sit for the Department of Transport examinations, and must be Canadian citizens or landed immigrants.

This occupation usually requires people with good communication skills who are interested in working with details, processes, machines and techniques and who enjoy achieving cooperative and successful working relationships.

B.C. Job Prospects

Employment growth for these occupations over the next few years is limited by the limitations placed on the number of vessels licensed to fish with a further restriction that replacement vessels must not exceed the replaced vessel in terms of length or tonnage. Slow growth in these occupations is also due to competition from fish farms who can generally produce fish at a lower cost.

New technology permits the achievement of output gains without significant increases in the size of the work force. In recent years there has been an increase in the number of larger seine vessels and a decline in the number of gillnetters and trollers.

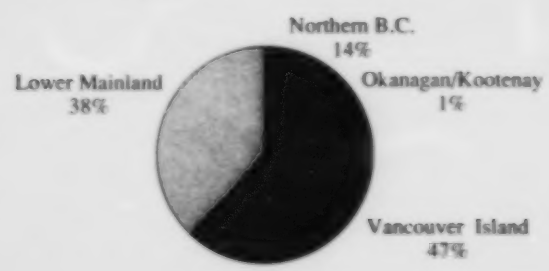
Requirements for captains/skippers and crew of fishing vessels are not expected to exceed replacement needs from people leaving the industry either to retire or for other reasons. Up to 1995 the number of captains/skippers and fishing vessel crew employed in B.C. is expected to decline slightly from the current level reflecting an expected overall decline in traditional fishing and a shift to aquaculture.

While women only make up 1% of the captains and other officers of fishing vessels, they do make up 12% of the crews of fishing vessels in B.C.

Earnings

The 1986 Census data indicates that captains and other officers who worked full-time over the full-year in B.C. earned on average an annual salary of $28,900, while fishing crews averaged $30,800.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,890	4,260	3,970

Annual Growth 1987-1995: -0.9%

Main Industries of Employment 1986 Census

Fishing	92%
Fish Processing	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
-290	700	410

75

Forestry and Logging Occupations

Forestry Conservation Occupations 7511

Nature of the Work

People in these occupations conserve forests by protecting them from fire, disease and other hazards. A forest protection officer patrols an assigned area to map forest data such as tree species, topographical features, tree seedling conditions, and marketable timber. Such an officer may also ensure that hikers, campers and people fishing comply with regulations, answer questions about the environment and regulations, assist lost or injured persons and participate in a search. A forest fire-fighter suppresses fires by felling trees, digging trenches and extinguishing flames. A fire lookout observes, locates and reports forest fires. Other occupations in this group are ranger, warden and tree spacer.

This is outdoor work and exposes individuals to extremes of temperature and weather. Fighting forest fires may be hazardous and includes exposure to smoke and fumes. Travel away from home and camp accommodation may be required. A five day, 40 hour week is standard with evening and weekend shifts; overtime may also be required. This is seasonal work.

Education and Skills

Employment as a forest officer (forest ranger) usually requires high school graduation or the equivalent, completion of a two year program in forest resource technology or resource management technology and six to twelve months on-the-job training. Several B.C. institutions offer two options within their Forest Resource Technology Programs. Those specializing in the recreation option are trained as park rangers, park planning technicians, conservation officers and wild land recreation specialists. Graduates of the program may transfer to UBC's forestry degree program. Malaspina College offers a diploma program in Resource Management Officer Technology which prepares students for such career opportunities as conservation officer and park warden. Admission requirements for both programs include Grade 12, with a strong background in math, science and English.

Qualifications necessary for becoming a fire lookout include the ability to operate a two-way radio and other communication equipment, and up to one month of on-the-job training under the supervision of an experienced worker. There are no specific education requirements. Forest fire-fighters usually must be 18 years old with some knowledge and experience in the forest environment. Also helpful is completion of the fire prevention courses which are offered as part of the forest resource technology program outlined above. One to two years of on-the-job training is also required.

Those interested in this work should enjoy activities of a technical nature, for example the use of two-way radios, meteorological instruments and timber measuring devices. They should have good spatial perception, physical strength and agility to climb and balance when traversing rough terrain.

B.C. Job Prospects

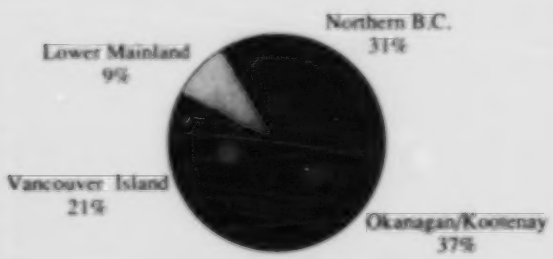
This group of occupations is largely dependent on government policy and funding. The 1981 to 1987 period showed high growth with annual average employment increases of 7%, much higher than the average for all occupations. This is a medium size job group; in 1987 about 1,400 persons were employed in forest conservation occupations. Projections are for growth at a slightly lower rate than average to 1995, for about 1,560 jobs by that time. Replacement needs will provide two-thirds of the total of 410 openings expected in the 1988 to 1995 period.

Women represented 13% of all employees in 1986, up from 1% in 1971 indicating that more women are entering this non-traditional occupation.

Earnings

The 1986 Census indicates that employment income for all forestry conservation occupations in B.C. were on average $8,900 annually, reflecting the seasonal nature of the work. For those 11% working full-time for the whole year, earnings averaged $31,900.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	920	1,400	1,560

Annual Growth 1987-1995: 1.5%

Main Industries of Employment 1986 Census

Forestry	87%
Government	7%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
160	250	410

7513 Timber Cutting and Related Occupations

Nature of the Work

People in these occupations harvest trees and are commonly known as loggers. They mark trees, clear undergrowth, and prepare a wooded area for logging operations. They fell the trees, remove limbs and bark, cut felled trees into logs and chips and transport slash. A timber marker, working ahead of the cutting crew, selects and marks trees for cutting according to size, condition, and forest conservation policies. A faller/bucker uses a chain saw to fall a tree in a safe manner and with minimum damage to that or other trees. The trees are trimmed of branches and cut into logs of standard lengths. Tree-harvester operators harvest smaller trees mechanically; this method is much more common in the interior than on the coast. Logging on the coast and on Vancouver Island is different from the rest of the province due to the very rugged terrain, dense undergrowth and large size of the trees being harvested. Falling especially presents challenges due to these factors.

People enter these occupations from lower skilled positions on the work site or with the same company. The usual starting position is as a labourer, forestry and logging (see profile SOC 7518).

This work involves exposure to extremes of temperature, dampness, noise, dust and hazards which require safety-conscious teamwork and use of safety equipment. The work site changes and the distance from a city or town may require temporary accommodation in a logging camp. A five day, 40 hour work week is standard, but may be disrupted by adverse weather conditions. The work is seasonal.

Education and Skills

There are no formal education requirements for entry into these occupations, although Grade 12 with high school mechanics as well as a college entry-level training program is recommended. Most companies provide on-the-job training lasting from one to six months under the supervision of an experienced worker.

Several institutions offer a 14 week Forestry Crewperson Program for general employment in the forestry industry. BCIT also offers a Tree Trimmer Trade Program which is a practical course dealing with the organization, maintenance and safety of tree trimming and climbing operations. Those who want to advance to more senior positions are advised to complete the two year college program in Forest Resource Technology, which requires Grade 12, including prerequisite courses in math, science and English.

Loggers should enjoy activities that are basically non-social in nature and are carried on in relation to machines, things and objects. They should like routine and organized work. They must be able to perform under stress when confronted with the critical or unexpected, such as branches or trees falling in the wrong direction.

B.C. Job Prospects

The B.C. forest industry is facing a timber stock which is increasingly located in more remote locations and on steeper slopes which are more expensive to log. As a result of these increased cost factors and mechanization, the growth rate in timber cutting occupations is forecast to be lower than average to 1995. This is similar to the growth experienced between 1981 and 1986. This is a large occupational group with 1987 employment of 5,000. Over 1,200 openings are expected in these occupations in the forecast period, more than half due to replacement needs.

In 1986 there were 97 women in these occupations representing 3% of total employment.

Earnings

The 1986 Census gives average annual employment income in these seasonal occupations in B.C. of $21,500 and $27,300 for those working full-time over the whole year. Hourly wage rates for unionized fallers/buckers, the most skilled of these occupations, were $28.53 in 1988.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,560	5,030	5,590

Annual Growth 1987-1995 1.2%

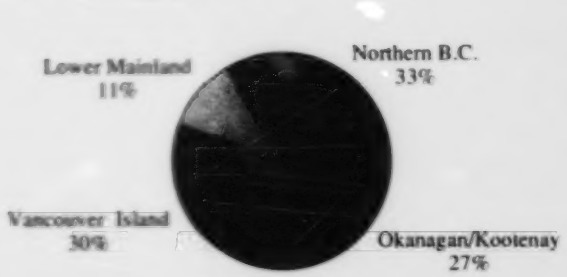
Main Industries of Employment 1986 Census

Forestry	86%
Wood Manufacturing	7%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
560	680	1,240

Employment by Region



Log Inspecting, Grading, Scaling and Related Occupations 7516

Nature of the Work

Timber cruisers, log scalers and log graders appraise standing and cut timber for usable volume and record data for management planning. Logging operations inspectors ensure compliance with logging contracts and safety rules. Timber cruisers walk over a forest area in an established pattern to estimate volume of timber, develop topographic maps and list area conditions for logging and land use. Log scalers estimate marketable contents of logs as timber or pulpwood including estimates of board footage loss due to saw waste, defects and tree shape. Log graders grade logs at the booming ground, mill-pond or in the woods and mark the ends of logs to designate them for veneer, pulp or lumber processing according to condition, size, species and owner. Logging operations inspectors ensure that logging contract conditions and safety rules are adhered to by examining logging areas for utilization practices, slash disposal, sanitation, observance of boundaries and safety precautions.

The work is outdoors in forests, often in remote locations. It involves the use of measuring and surveying equipment. A five day, 40 hour work week is normal and some overtime or weekend work may be required. This work is seasonal with layoffs common during spring breakup and with peak periods in the summer and fall.

Education and Skills

BCIT, Malaspina and Northwest Colleges offer log scaling programs which prepare students to take the Ministry of Forests written and practical exams to obtain a scaling license. Admission requirements include physical suitability, Grade 10 and proficient math skills. Those interested in becoming timber cruisers or logging operations inspectors should take the two year Forest Resource Technology Program available at several institutions. This program requires Grade 12, with a strong background in math, science and English. On-the-job training of six to twenty-four months under the supervision of an experienced worker is also required. In addition to physical strength and stamina, those interested in these occupations should have numerical ability and spatial perception to make calculations when estimating marketable content of logs. Adaptability to work in hazardous and extremely wet weather conditions is also required.

B.C. Job Prospects

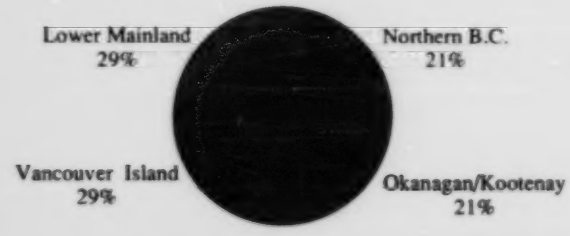
Quality control in the forest industry is becoming more important as the industry strives to make better use of its raw materials and as products become more specialized. This is a small occupational group in B.C. with 1987 employment of 920; 12% fewer employed than in 1981. This reflects the application of computer technology in estimation and the requirement to rationalize the workforce in the industry due to the recession of the early 1980s. The outlook calls for 90 new jobs between 1987 and 1995, a lower than average annual growth rate of 1.2%. Most of the total of 310 job openings in these occupations in the period 1987 to 1995 will be derived from replacement needs as current workers retire or transfer.

Women's employment in this occupation has increased from virtually none in 1971 to 18% in 1986 as proportionately more women enter this occupation.

Earnings

This occupational group covers a variety of occupations and so wages vary according to position, qualifications and skills. The 1986 Census shows that average earnings in B.C. in these occupations were $24,178 for all workers and $34,474 for the one-third of workers able to work the full-year, full-time in this seasonal occupation. Unionized hourly wages in 1988 were $17.41 for log graders and licensed scalers.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,040	920	1,010

Annual Growth 1987-1995: 1.2%

Main Industries of Employment 1986 Census

Forestry	72%
Wood Manufacturing	20%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
90	220	310

7517 Log Hoisting, Sorting, Moving and Related Occupations

Nature of the Work

People in these jobs move logs from where they have been cut and organize them for transportation to the processing plant. A rigging slinger installs ground rigging for yarding lines and directs workers in attaching chokers to logs and then to yarding lines. A steel spar operator and a skidder operator use their machines to haul logs to a central loading area. A chaser directs placement of the logs at the loading area, removes the choker from the logs and assists in the loading of logging trucks. This description is typical for a large log operation; with smaller logs many of these operations are combined and mechanized. On the coast the logs may be assembled in the water into booms by dozer-boat operators and boom workers; these are typical occupations. Others are logging truck loader, high rigger and beachcomber. Most workers in these occupations are recruited from logging labouring positions (see profile SOC 7518).

This work is outdoors and workers are vulnerable to the elements. The work site is likely to be noisy and dusty or muddy. Workers may be exposed to vibration and very hazardous situations due to moving logs and equipment where teamwork is important. This work is physically demanding.

The work week is normally 40 hours over five days. Overtime and weekend work may be required. The work is seasonal with layoffs being common during the spring breakup. In the case of smaller operators work may be on a project by project basis and layoffs may occur between projects. The work site may be remote and may require travel and/or camp accommodation.

Education and Skills

There are no formal educational requirements for entry into these occupations. Most companies provide on-the-job training lasting from one to six months (one to three years for boom-boat operators) under the supervision of an experienced worker. Grade 12 with high school mechanics and, if available, a college entry-level training program is recommended.

Malaspina College offers a 16 week Heavy Equipment Operator Program, which requires a class five driver's license. Northwest College and the B.C. Safety Council offer various truck and equipment operating courses. Recommended for those interested in becoming rigging slingers is the 14 week Forestry Crewperson Program offered by several institutions. Grade 10 and excellent physical condition are required.

These workers should be adaptable to working outside while exposed to hazards such as falling trees, snapping cables or falling off logs in booms. They must have strength and agility.

B.C. Job Prospects

During the early 1980s recession these occupations suffered job losses and total employment declined by 25% from 1981 to 1987. By 1987, 4,200 people were working in these occupations, a fairly large job group. The projection is for lower than average growth to 1995 when employment will still be much lower than the 1981 level. A total of 800 job openings will be available in the eight years to 1995, about half due to replacement needs and half due to new job creation. People considering entry to this and other logging industry occupations are advised to contact the industry for up to date information before making career decisions.

Women represent 1% of all workers in these occupations, however they are more numerous than in 1971.

Earnings

According to the 1986 Census results, the average B.C. employment income in this occupational group was $25,600 as compared to $30,300 for the 18% of workers who were employed full-time over the full-year. Hourly rates in the coastal, unionized sector of the industry in 1988 were $17.41 for rigging slingers and $16.73 for skidder operators and boom-boat operators.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,650	4,210	4,640

Annual Growth 1987-1995: 1.2%

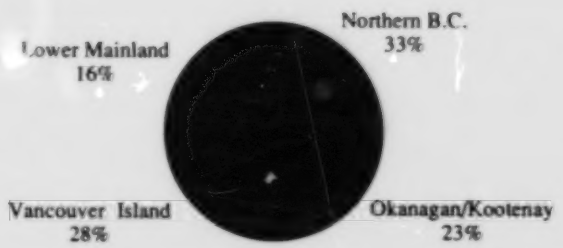
Main Industries of Employment 1986 Census

Forestry	80%
Wood Manufacturing	14%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
430	370	800

Employment by Region



Labouring and Other Elemental Work
Forestry and Logging 7518

Nature of the Work

People in these occupations do the labouring required in logging and reforestation. These are lower skilled and usually entry-level positions. In logging, choke setters drag a steel cable to a log, pass one end around the log and hook it to a sliding fastener on the choker cable to form a noose. Other logging functions are cable hooker, labourer, log hooker and post peeler. In reforestation, seed cone pickers gather cones in the forest by climbing trees or by using a hooked pole. Tree planters carry seedlings to the planting site, make a hole using a mattock, place the seedling in the hole and tamp soil around it. Once employed, individuals can apply for other higher skilled jobs on the work site or within the company.

Labouring positions in the logging industry expose workers to weather, dust, mud and noise. The work is hazardous due to moving logs and equipment. Forestry labouring may require periods in logging camps. Reforestation labourers may be required to supply camping gear. Work in reforestation exposes workers to the elements and involves working alone or as part of a team in the woods.

A 40 hour work week is standard and overtime and weekend work may be required. This work is seasonal with layoffs in logging likely during spring breakup. Reforestation is usually on a contract to contract basis during a fairly short summer season, usually with long daily hours during the contract.

Education and Skills

There are no formal education requirements for entry into these occupations. Companies provide on-the-job training ranging from a short demonstration to one month under the supervision of an experienced worker. Grade 10 and the 14 week Forestry Crewperson Program is recommended. It is offered by BCIT and other colleges and requires Grade 10, minimum age 17 and excellent physical condition. These workers require manual dexterity to use forestry tools as well as physical strength and coordination to climb and balance on trees and to traverse rough terrain.

B.C. Job Prospects

The logging industry has been reducing the number of labourers through mechanization. This may be up to 25% as indicated by the experience of other occupations in the logging industry. However, employment in reforestation has increased largely due to federal-provincial agreements injecting funds to improve the practice of silviculture in B.C. This shift toward reforestation means that some labourers in logging are moving to reforestation work and that most new jobs will be here. These are largely contract jobs lasting a relatively short period during the year. This period may be extended since planting crews are often involved in tree spacing. With over 2,400 workers, this is a fairly large occupational group. The number of workers in these occupations is expected to increase by 1.4% annually between 1987 and 1995, a rate below the average of all occupations. While the total number of openings is expected to be 430, two-thirds of these will be new jobs with the remainder being replacements.

The number of women in labouring in these occupations has increased from 325 in 1971 to 780 in 1986, which represents a doubling in percentage terms to 22%. Reforestation has proved particularly attractive to women.

Earnings

The average B.C. earnings for this seasonal occupational group as indicated in the 1986 Census was $9,800 per year. This compares to $21,300 for the 8% of workers who worked full-time for the full-year. Unionized hourly wages for labourers were $15.54, with rates of $15.95 for choke setters, and $15.82 for tree planters. Non-union rates in tree planting are lower.

Employment by Region

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,290	2,460	2,750

Annual Growth 1987-1995: 1.4%

Main Industries of Employment 1986 Census

Forestry 94%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
280	150	430

77

Mining and Quarrying (including Oil and Gas Field) Occupations

▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼

▶ Rotary Well-Drilling and Related Occupations 7711

Nature of the Work
Rotary drillers, oil drillers, seismograph drillers, pipe pullers and service rig operators are concerned with sinking deep holes to explore for or to extract oil and natural gas. Their work involves assembling, erecting and operating drills, lowering and raising drill pipes, bits and instruments and inspecting, testing and servicing wells.

This work demands both physical stamina and mental alertness, as working conditions are sometimes difficult and hazardous. The job site is often in an isolated location.

Education and Skills
High school graduation is usually the minimum education level necessary in these occupations. Between five to ten years of on-the-job training and experience in other positions on the drill crew are normally required before becoming a rotary driller. Completion of BCIT's two year Petroleum Technology Program is an asset. This program is designed to cover all aspects of the petroleum industry, including drilling technology. Admission requirements include Grade 12, with Algebra 12 and Physics 11 or Chemistry 11.

Workers in these occupations need strength to push heavy piping and to work in awkward positions in order to change drill bits. They must have adaptability to unpleasant atmospheric conditions such as the odour of hydrogen sulphide gas and diesel engine fumes.

B.C. Job Prospects
Based on employment patterns of the services dependent on the mining and construction sectors, which are recovering from an extended recession, projections to 1995 call for these jobs to grow much faster than the average for all other occupations. This contrasts with the situation between 1981 and 1987, when the recession in the oil industry and fluctuations in the price of oil slowed employment growth. Unemployment figures in 1987 show that labour market conditions in these occupations rank among the least favourable. This should change, however, because improvements in the industry trends suggest an increase in the demand for drillers over the projection period. Nevertheless, this is a small job group in B.C. with the number employed in 1995 expected to be about 480. This includes an estimated 130 new job openings and 20 replacement opportunities expected over the projection period.

This occupational group is highly vulnerable to changing economic conditions, fluctuating oil prices and commodity prices. Employment in the group is not, however, significantly affected by changes in technology. Most of these workers are employed in the mining, construction, and petroleum and coal products industries. While most positions are full-time, there is a distinct seasonal pattern of employment, the high seasons being the summer, fall and winter, and the slow months occurring in the spring. The majority of rotary drillers in Canada reside in Alberta and Saskatchewan.

Earnings
In B.C. the average annual employment income of this job group was approximately $24,800 in 1986. Only 26% were employed full-time, full-year, and these workers' average incomes were $38,800.

In 1986, the average hourly crew wages in B.C. were $16.74 for drillers; $14.23 for derrick hands; and $10.13 for lease hands.

Related Occupations
Geophysical Technicians.

Employment by Region

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	430	350	480

Annual Growth 1987-1995: 4.1%

Main Industries of Employment 1986 Census

Mining	84%
Construction	7%
Petroleum & Coal Products	7%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
130	20	150

Nature of the Work

This occupational group includes air-drill operators, rock drillers, water-well drillers, auger operators, as well as diamond drill runners. Their work involves using explosives in underground and surface mining, in quarries and on construction projects; operating drills; breaking and separating rock; and installing air and water pipelines leading to the working surface.

The physical demands of the work are heavy. Working conditions are underground, where temperatures are generally agreeable. Although workers are exposed to noise, humidity and odours, safety, health and sanitary conditions are closely monitored and hazards are known, recognized and controlled.

Education and Skills

Employment in these occupations usually requires a minimum age of 18 and completion of Grade 10, with Grade 12 preferred. From three to twnety-four months of on-the-job training and related experience are required to become a proficient underground or surface (rock and soil) mining driller. Many companies prefer that a driller work for at least a year as a miner to become familiar with mining techniques. BCIT offers a three week Diamond Driller Helper Program to train helpers for blasting in mining and construction projects. A Miner's Certificate of Fitness indicating absence of any respiratory disorders is required for underground drilling. There is a two year Water Well Driller Apprenticeship Program. Until B.C. technical training is available, all apprentices in this trade must pass the B.C. trades qualification (TQ) exam in order to be eligible for certification. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12, and a math and science 11.

In addition to good manual dexterity for skillful use of a variety of tools, these occupations require the capacity to stoop and crouch to set up drilling equipment.

B.C. Job Prospects

Based on growth prospects for the metal-mining and construction sectors, the outlook to 1995 calls for employment to grow much faster than the average for all other occupations. This forecast differs from the situation between 1981 and 1987, when employment in the B.C. mining industry fell significantly because of mine closures and layoffs resulting from a deteriorating market situation and increased foreign competition. This is a medium size job group in B.C. with the number employed in 1995 expected to be about 1,260. This includes an estimated 280 new job openings and 90 replacement opportunities expected over the projection period.

Employment among drillers is moderately susceptible to changes in business conditions. Fluctuating commodity prices and varying patterns in metal consumption affect employment opportunities. New mining methods, the development and adoption of new drilling equipment, computer-aided mining machinery, underground computer terminals, and overall increased computerization will result in a demand for more highly skilled workers in this occupational group. Drillers are concentrated in Ontario, Quebec and B.C. In B.C., they are primarily employed in the mining, construction and forestry industries. Opportunities for part-time work are less than in the labour market at large, although in 1986 only one in four of these jobs was full-time, full-year.

Earnings

The average annual employment income for these workers in B.C. was approximately $27,500 in 1986. Only 25% were employed full-time, full-year, and these workers' incomes averaged $42,500.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,610	980	1,260

Annual Growth 1987-1995: 3.3%

Main Industries of Employment 1986 Census

Mining	52%
Construction	36%
Forestry	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
280	90	370

Employment by Region

Blasting Occupations 7715

Nature of the Work
People in this group include oil-well shooters, dynamiters, blasters and seismograph shooters, who use detonating explosives to demolish structures or land forms (rocks, trees) on construction sites and with mineral, oil and natural gas exploration. This type of work is usually performed outdoors. While exposure to gas fumes and noxious vapours is unavoidable, proper use of safety equipment minimizes the risks. Rotating shift work is usual.

Education and Skills
While there are no specific education requirements for employment in these occupations, individuals must be at least 18 years old. Most blasters acquire the necessary skills through on-the-job training and experience. After at least four years of related mining experience, three to twelve months on-the-job training are required to become a blaster. BCIT's two year Mining Technology Program covers all aspects of the industry, including blasting. Admission requirements include Grade 12, with Algebra 12, Physics 12 and Chemistry 11.

These workers must have a knowledge of safety regulations to handle explosive materials and use blasting equipment. In addition to having good hearing, eyesight and manual dexterity, these workers must also be emotionally stable and have the ability to work cooperatively on a team.

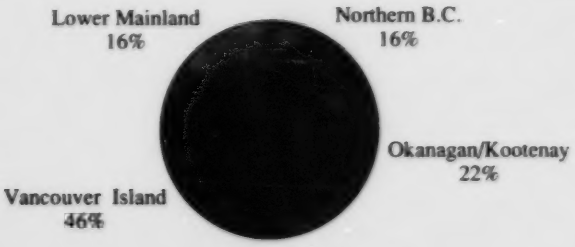
B.C. Job Prospects
Based on employment patterns in the mining and construction sectors, projected growth to 1995 calls for these jobs to grow much faster than the average for all other occupations. This differs from trends between 1981 and 1987, when employment declined because user industries were hard hit by the 1981-82 recession, however, employment in 1995 will still be significantly lower than employment in 1981. This is a small job group in B.C. with the number employed in 1995 expected to be about 460. This includes an estimated 80 new job openings over the projection period, and 100 openings resulting from the need to replace existing personnel who leave the occupations.

This occupational group is vulnerable to changes affecting the forestry, construction and mining industries. Since the 1981-1982 recession, labour market conditions have not been favourable. This is seasonal work characterized by part-year employment. Most job opportunities are in the spring, summer and fall, with is a slight slowdown during the winter months. As a result, only 27% of these workers in B.C. were employed full-time, full-year in 1986. Most blasters work in B.C., Ontario and Quebec.

Earnings
The average annual employment income for these workers in B.C. was approximately $28,600 in 1986. Only 27% were employed full-time, full-year, and these workers' incomes averaged $34,100.

Related Occupations
Rock Drillers.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	560	380	460

Annual Growth 1987-1995: 2.5%

Main Industries of Employment 1986 Census

Forestry	35%
Construction	31%
Mining	29%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
80	100	180

7719 Other Mining and Quarrying (including Oil and Gas Field) Occupations

Nature of the Work

Mining and quarrying industries are involved in the extraction of minerals from the earth. This classification includes various occupations that are involved in underground mining from the medium skill level jobs of shaft and track repairers to the high skill level jobs of hardrock miners, who operate complex machinery for production or development of mines.

Underground mining, regardless of the ore extracted, occurs in a unique work environment. It requires work in dark and damp conditions, with varying temperatures. The underground work environment is often hazardous and may involve working alone or in a small crew, with little supervision in an isolated unlit area of the mine where communication is limited.

Education and Skills

Underground mining occupations are generally considered to be skilled fields. The equipment and techniques used in underground mining are varied and complex, with many areas requiring significant safety and skill training. However, there is no specific education required for employment in these occupations and training is usually provided on-the-job. Miners require a Miner's Certificate of Fitness issued by the B.C. Ministry of Energy, Mines and Petroleum Resources indicating absence of any respiratory disorders. Usually, miners must be 18 years old with a minimum Grade 10 education.

Training for hardrock miners is normally on-the-job or in a simulated setting and requires from two to four months depending on previous exposure to the industry. Further experience of from one to several years is normally expected for more senior or higher paying jobs or for employment with development crews.

In below-ground mining occupations, the ability to work in the underground mine environment is one of the most important requirements. Independence and an ability to respond to problems and emergencies are also important.

B.C. Job Prospects

Although job growth in this occupational group declined between 1981 and 1987, projections to 1995 call for jobs to grow much faster than the average for all other occupations. New developments in the price and demand for gold and other precious metals as well as some more general mining recovery has boosted the requirement for skilled people in this field. This is a small job group in B.C. with the number employed in 1995 expected to be about 900. This includes an estimated 170 new job openings and 100 replacement opportunities expected over the projection period. Currently, there is a shortage of skilled workers in hardrock/underground mining, especially in Northern B.C. Additional labour requirements are expected for new precious metal mines planned to open in 1989.

Most workers in this field are employed in metal mining, coal mining and the petroleum and natural gas industry. Seasonal work is minimal and most work is full-time. Women's representation in this labour force has increased from 3% to 7% between 1971 and 1986.

Earnings

The average annual employment income of this job group in B.C. was approximately $23,600 in 1986. Only 37% were employed full-time, full-year, and these workers' incomes averaged $35,000.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	940	730	890

Annual Growth 1987-1995: 2.6%

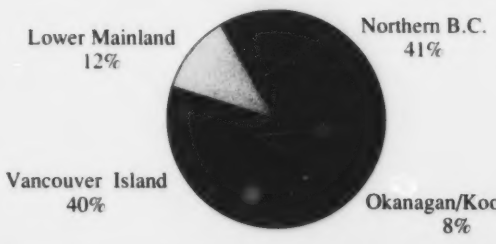
Main Industries of Employment 1986 Census

Metal Mines	27%
Coal Mines	25%
Crude Petroleum & Natural Gas	15%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
170	100	270

Employment by Region



82/83

Processing
Occupations

▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼

Baking, Confectionery Making and Related Occupations 8213

Nature of the Work
Bakers mix and bake ingredients according to recipes to produce breads, pastries and other baked goods in establishments where goods are produced in small quantities for consumption on the premises or for sale as specialty baked goods. A baker may bake a particular product and be designated accordingly; for example, biscuit baker, bread baker, specialty foods baker or pastry chef. Other occupations in this field include chocolate makers. Less skilled jobs are for helpers in the confectionery and other bakery items produced by the food manufacturing industry. This work involves standing for prolonged periods.

Education and Skills
A ten month Commercial Baking training program is available at BCIT, Vancouver Vocational Institute (VVI), Malaspina College or Selkirk College. Graduates are prepared for entry-level work in the trade or to start the Baking Apprenticeship which lasts three years and includes four weeks of in-school technical training each year. Those who have completed the Commercial Baking Program receive Level 1 technical training credit. Apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11. Those who have not completed an apprenticeship may apply to write the B.C. Trades Qualification (TQ) Certification examination after four years of suitable experience.

For bakers who want to advance, VVI also offers a Baking Pastry Arts Program and a Baking/Pastry Upgrade Program which provides training in specialized areas of the baking industry.

B.C. Job Prospects
Although job growth in this occupation was well above average between 1981 and 1987, projections to 1995 call for jobs to grow more slowly than the average for all other occupations. However, this is a fairly large job group in B.C. with the number of jobs in 1995 expected to be about 4,000. This includes an estimated 970 job openings expected over the projection period, with most of them resulting from attrition.

The best opportunities are projected for bakers who have the higher skill levels needed to meet the current demand for specialty food items.

In 1987 unemployment among these workers in B.C. was above average, reflecting the numbers of workers in helper categories as well as those who have not completed sufficient training to be able to compete for bakers' jobs.

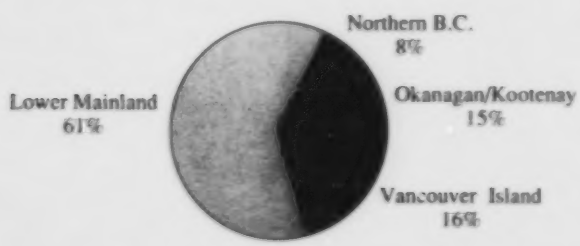
The main industries of employment for bakers are bakery products, retail bakery stores and the accommodation and food services industry. Employment patterns in this occupational group tend to be sensitive to economic conditions.

In 1986, 40% of these jobs were held by women, an increase from 1981. A higher than average proportion of this work force is employed part-time.

Earnings
The average annual employment income of this job group was approximately $14,100 in 1986. Forty-four percent were employed full-time, full-year, and these workers' incomes averaged $19,800.

Related Occupations
Chefs, Cooks and Bakery Products Sales Representatives.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,690	3,630	4,020

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Bakery Products	55%
Retail Trade	26%
Accommodation & Food Services	14%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
390	580	970

8215 Slaughtering and Meat Cutting, Canning, Curing and Packing Occupations

Nature of the Work
Butchers and meat cutters cut animal carcasses into wholesale cuts such as ribs, rounds, loins and chucks in supermarkets, wholesale food outlets and meat packing plants. They use knives and saws to convert wholesale cuts into retail cuts such as steaks, chops and filets. Meat cutters in retail food stores arrange and display meat items in refrigerated cases and assist customers. Specialty sausage makers are also in this occupational group.

Work is in a refrigerated environment and involves standing for long periods of time.

Education and Skills
There are no specific education requirements for most of these occupations. To become a butcher requires a high school education followed by one to five years of on-the-job training under the supervision of an experienced worker. For those interested in meat cutting, BCIT and Cariboo College offer a six month entry-level trades training program in Meat Cutting and Processing. Admission requirements include Grade 10, with Grade 12 preferred and graduates may look for entry-level employment in the trade or start the Meat Cutting Apprenticeship, which lasts two and one-half to three years. BCIT also offers a three month Meat Wrapping Program.

Workers in these jobs need good eye-hand coordination and manual dexterity to use mechanical devices and other tools. They should have the adaptability to walk in and out of refrigerated rooms, to work in wet and humid areas permeated with meat odors and to work with sharp tools that may cause hand or finger injuries.

B.C. Job Prospects
Although job growth in this occupation was below average between 1981 and 1987, projections to 1995 call for jobs to grow about as fast as the average for all other occupations. This is a fairly large job group in B.C. with the number of jobs in 1995 expected to be about 4,000. This includes an estimated 490 new job openings and 530 replacement opportunities expected over the projection period. In 1987 unemployment was about average, suggesting that competition for job vacancies may be quite stiff.

The main industries of employment are in retail food stores and the slaughtering and meat processing industry. The best opportunities are projected for workers in the specialty, deli-style markets. Employment patterns in this occupational group tend to be sensitive to economic conditions.

In 1986, women made up 22% of this occupational group. Opportunities for part-time employment are less than in the labour market at large.

Earnings
The average annual employment income of this group was approximately $19,500 in 1986. Fifty-five percent were employed full-time, full-year, and these workers' incomes averaged $24,900.

Related Occupations
Bakers, Cooks and Kitchen Supervisors.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,740	3,510	4,000

Annual Growth 1987-1995: 1.6%

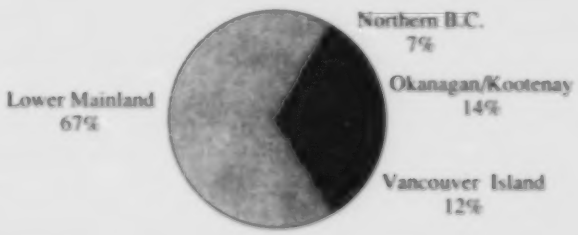
Main Industries of Employment 1986 Census

Retail Trade	50%
Slaughtering & Processing	46%
Wholesale Trade	2%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
490	530	1,020

Employment by Region



▶ Sawmill Sawyers and Related Occupations 8231

Nature of the Work

Sawmill sawyers operate and tend lumber-mill equipment to process logs into rough lumber, and to saw and plane rough lumber into stock of various sizes such as dressed dimensional lumber or shingles. A head-saw operator saws a log into slabs based on the grade, condition and size of the log with the objective of obtaining optimum lumber production. An edger tender cuts boards to specified widths. A trimmer operator uses banks of circular saws to cut defective sections from boards and to trim boards to length. A planer operator dresses rough lumber to specific dimensions. A shingle sawyer saws wooden blocks into shingles after determining the best method for maximum utilization of each block.

Sawyers must be able to make judgments regarding the wood they are cutting and normally reach their positions from within the plant or industry. Introduction of technology has required different skills including the ability to operate programmable logical controls. Although workers will increasingly control operations with these devices they will need the skills to program these machines and when necessary to override them.

Sawyers work indoors in sawmills and shingle mills which may be cold and drafty in the winter and hot in the summer. The work is repetitive, noisy and may involve risk of injury due to moving lumber and equipment.This work is full-time and is not seasonal. A 40 hour, five day week is standard and shift work may be required.

Sawmill sawyers are recruited from lower rated staff within the mill. The typical entry position into the mill is labouring, wood processing (see profile SOC 8238).

Education and Skills

These occupations are usually learned through practical experience. Most companies do not require high school graduation, but as the industry becomes more technical Grade 12 is preferred. To become a head-saw operator, edger operator, trimmer operator or lumber-sizer operator usually requires completion of the four month Lumber Grading Course offered by the Council of Forest Industries of British Columbia, Vancouver. This is followed by two to four years of on-the-job experience.

These workers need to be alert and have a good sense of balance as well as good eye-hand-foot coordination and physical strength.

B.C. Job Prospects

The recession of the early 1980s accelerated a restructuring and rationalization of the wood manufacturing industry. This included sawmill closures and modernization of remaining mills. In the shingle industry there was a move toward smaller and mostly non-union operations. Between 1981 and 1986 about 16% of all jobs in this occupation were lost. With 3,900 jobs this occupation still ranks as a fairly large job group. However, no growth is expected in the forecast period. All of the 370 openings expected will be to fill replacement needs.

Women represented 4%, or 180 workers, in these occupations in 1986 an increase from 1%, or 40 women, in 1971.

Earnings

The 1988 hourly wage rates in the unionized coast mills range from $17.43 for trimmer operators to $21.06 for head-saw operators in the Vancouver area. The 1986 Census indicates that the 51% of B.C. workers employed full-time, full-year earned about $30,000.

Employment by Region

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,660	3,900	3,890

Annual Growth 1987-1995: -0.1%

Main Industries of Employment 1986 Census

Wood Manufacturing 97%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
-20	390	370

8233 Plywood Making and Related Occupations

Nature of the Work

Workers in these jobs cut veneer and make plywood by operating and tending machines that peel, slice, patch, glue and press veneer into plywood sheets and sand and repair plywood into a finished product.

Veneer cutters operate veneer lathes to peel veneer from a log. Clipper operators cut the continuous peeled veneer into sheets or strips accounting for defects. Veneer jointers make up full sheets by gluing strips together. Veneer patchers repair defects in sheets of veneer. A core laying machine operator combines layers of veneer and glue which are bonded in a hot press operated by a hot press tender. A patcher operator patches glued panels to eliminate remaining surface defects while a panel sanding-machine operator smooths plywood or other panels.

To a very large extent these jobs are machine operator functions and are therefore subject to technological change, with the new jobs being fewer and requiring higher skills.

The normal work week is 40 hours over five days. This is not seasonal work. Most people in these occupations are hired from other related occupations at a lower level in the same plant.

Education and Skills

Most wood processing occupations are learned on the job in B.C. For example, a panel-sanding-machine operator requires six to twelve months on-the-job training. The minimum education requirement is Grade 10, with Grade 12 preferred. BCIT offers a two year Wood Products Technology Program.

Workers in these occupations need good form perception to match veneer according to grain and pattern or to discern defects such as knots, pitch, pockets and holes in veneer or plywood. They also need good eye-hand-finger coordination and manual dexterity to adjust machine controls, position work pieces and use measuring instruments and tools.

B.C. Job Prospects

The recession of the early 1980s, combined with increasing use of plywood substitutes such as waferboard and particleboard, has led to a large decline in the number of jobs in the plywood industry. Between 1981 and 1987 the number of workers declined by 32%. By 1987 the remaining 1,110 workers made up a medium size job group in the context of B.C. occupations. The projection to 1995 is for no new jobs, and all of the 160 forecast openings will be for replacement needs.

Jobs have also shifted from the coast to the interior where newer, automated plants are now producing the staple commodity plywood. Coastal plants with access to higher quality logs and which have not been modernized, are surviving by producing specialty overlay board.

Women comprised 11% of the work force in 1986.

Earnings

Hourly wages for plywood making and related occupations in unionized mills (all mills are either unionized or worker-owned) ranged upward from $15.33 in 1988.

The 1986 Census results indicate that a full-time full-year worker in B.C. earned just over $30,000 annually.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,640	1,120	1,110

Annual Growth 1987-1995: 0%

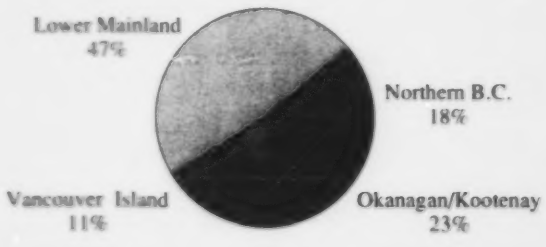
Main Industries of Employment 1986 Census

Wood Manufacturing 95%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
0	160	160

Employment by Region



▶ Wood Treating Occupations 8235

Nature of the Work
People in these occupations operate and tend machines and equipment to season or condition wood, treat wood with preservatives or fire retardants and produce wood conglomerates such as chipboard, particleboard, hardboard or artificial fuel logs. Operators tend kilns, dryers, humidifiers and ovens which control the humidity or curing of various products. They tend tanks and machines which dip products in preservatives or fire retardants, or which apply an oil finish to a product. They also tend machines which combine wood chips or particles with waxes or resins to prepare them for processing into panels.

A 40 hour, five day week is standard, however overtime and weekend work may be required. This work is usually indoors in mills which may be hot near kilns and humidifiers. There may be exposure to dust and fumes. This work is not seasonal.

People are usually selected for these occupations from applicants within the plant in lower level positions. Entry positions are in labouring - wood processing (see profile SOC 8238).

Education and Skills
There are no formal requirements for entry into these occupations. Most companies provide on-the-job training under the supervision of an experienced worker. The length of on-the-job training varies from two weeks to four months, depending on the complexity of the job and the individual's education and practical background. Grade 10 or equivalent is required with Grade 12 preferred.

These workers need good spatial perception to visualize desired characteristics of end products and to understand the functions and relationship of machine parts in order to operate and adjust wood-treating equipment. They should have the ability to work inside while exposed to extreme heat from equipment such as kilns and steam-heated dryers.

B.C. Job Prospects
This occupation was affected by the recession of the early 1980s with a similar impact to that of other wood manufacturing occupations. Employment fell by 15% between 1981 and 1987. With employment of 390 in 1987, this is a very small occupation in B.C. The outlook to 1995 is for almost zero growth, with a total of 60 job openings forecast, almost all for replacement needs.

The number of women in this occupation has increased threefold from ten in 1971 to thirty in 1986, a small but growing presence.

Earnings
The 1986 Census indicated that a B.C. worker who was employed full-time full-year earned an average of $32,680. Wage rates in 1988 ranged upward from $15.33 per hour for unionized employees.

Employment by Region

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	450	390	390

Annual Growth 1987-1995: .2%

Main Industries of Employment 1986 Census
Wood Manufacturing 83%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
10	50	60

8236 Inspecting, Testing and Grading Occupations, Wood Processing (except Paper Pulp)

Nature of the Work

Inspectors, graders and testers classify and ensure quality control of products such as lumber, veneer, plywood, shingles, railroad ties and telephone poles. Lumber graders examine lumber for defects such as knots, faulty edges, pitch pockets, wormholes and incorrect dimensions, and grade and mark lumber to fill orders or for remanufacturing, trimming or upgrading. Veneer and plywood graders mark individual sheets with the grade according to standards which downgrade veneer and plywood for defects such as knots, holes, splits or unsanded areas. A shingle inspector ensures production of shingles of specified thickness, verifies that bundles contain the correct quantity of shingles and sorts bundles into different grades.

These occupations are generally indoors in mills which may be cold and drafty in winter and hot in summer. Exposure to dust and noise is usual. A 40 hour, five day work week is standard, and overtime may be required. This work is not seasonal.

People filling vacant positions usually come from lower paid positions in the existing work force of the plant or mill. The usual entry position into a plant or mill is as labourer (see profile SOC 8238).

Education and Skills

Workers in these occupations normally require Grade 10, with Grade 12 preferred and three to twelve months experience in a related occupation. An industry training program has been implemented for workers in these occupations.

These workers need numerical ability to make measurements and calculations quickly and accurately as well as form perception to inspect lumber for defects such as knots, stains, faulty edges and worm holes. They also must be able to work either inside or outside while exposed to loud continuous noises from woodworking machinery.

B.C. Job Prospects

The recession of the early 1980s accelerated an ongoing process of modernization and rationalization. In the entire B.C. forest industry from 1981 to 1987 there was a 24% loss of jobs in these occupations. This is a medium size job group with 1987 employment of 1,790. The outlook for the eight year period ending in 1995 is for no change in the level of employment while replacement needs will create 220 job openings.

This is one occupation where the projection may underestimate net growth. The industry is faced with increasing product differentiation where quality control becomes increasingly important both to deliver high quality products to demanding customers and to make the best use of materiel in their plants for different product lines.

Earnings

In 1988 union hourly rates for lumber graders were $17.43 and for inspectors $18.86.

For B.C. the 1986 Census reported that the employment income for full-time, full-year workers (61% of total) averaged $32,400.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,360	1,790	1,790

Annual Growth 1987-1995: 0%

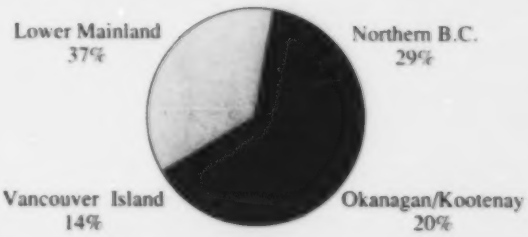
Main Industries of Employment 1986 Census

Wood Manufacturing 92%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
0	220	220

Employment by Region



Labouring and Other Elemental Work, Wood Processing (except Paper Pulp) 8238

Nature of the Work

Labourers in sawmills, plywood mills, wood preserving plants and shingle mills do the lesser skilled work which often involves lifting, sorting, cleaning and feeding material into machines. They work in all phases of processing from cleaning debarkers to loading finished products for transportation. Where hand feeding or stacking of lumber, plywood or other material is required labourers are typically assigned to the work.

As new technology is introduced in production of lumber, plywood and other wood products, labouring jobs tend to be the first displaced. The remaining jobs in the mills require greater skills. However, labouring is the usual entry position into a plant from which individuals in higher rated positions are recruited.

Labourers typically work a five day, 40 hour week on rotating shifts. The work is not seasonal. Exposure to noise, dust and temperature extremes is usual.

Education and Skills

There are no specific education requirements for workers in these occupations. Training is on-the-job and ranges from a short demonstration up to one month. These workers must be physically fit because most jobs require physical exertion, such as frequent bending and heavy lifting.

B.C. Job Prospects

In the early to mid-1980s the industry went through a recession which forced a shift to new and more specialized products and the rapid introduction of new technology. The combined result of these effects has meant higher output with fewer employees. The number of labourers fell 16% from 1981 to 1987, when 5,660 labourers were employed.

This is one of the larger occupations in the province, however the outlook to 1995 is one of no growth due to the combined effects of market fluctuations and further application of new technology. The 360 openings expected in this occupation to 1995 will be to replace workers leaving this occupation for higher rated jobs, retiring or quitting.

The unionized portion of the industry has agreed to give limited preference to previous employees. This agreement formally gives the labour supply in the industry rights to re-entry. Individuals considering occupations in the wood manufacturing industry should be aware of this system and that many previous employees are waiting for work.

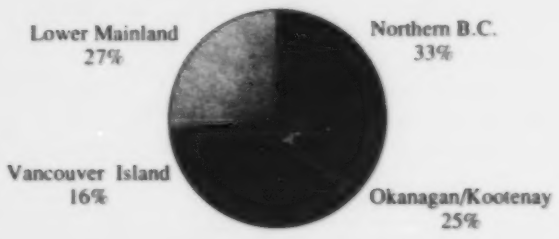
Women's participation in this occupation increased from 2% in 1971 to 6% in 1986.

Earnings

Average employment earnings in B.C. for all workers were $22,500 according to the 1986 Census. For the less than half of all workers who worked full-time, full-year, earnings averaged $29,800.

The 1988 hourly rate for labourers covered by the IWA Canada coast agreement was $15.33.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	6,760	5,660	5,630

Annual Growth 1987-1995: -0.1%

Main Industries of Employment 1986 Census

Wood Manufacturing 98%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
-30	390	360

8253 Papermaking and Finishing Occupations

Nature of the Work

Papermaking and coating operators tend equipment to make paper, paper pulp, and paperboard from pulp slurry and to impregnate paper with size and coating mixtures. These workers are responsible for the quality and quantity of paper and for the efficient operation of paper machines. Finishing occupations include workers who operate and tend equipment that glaze and impregnate paper with coating mixtures, that wind, cut and slit paper reels into smaller reels or sheets. The equipment is becoming more and more automated and computer controlled, and operators are required to learn the skills to operate such equipment.

Workers in this occupational group are highly skilled and are recruited from workers in lower rated positions in the plant. Due to the specialized nature of the work, fairly limited lines of progression and seniority rules, mobility between plants tends to be low except at the time a new plant is starting up. The usual entry point into a plant is as a labourer (see profile SOC 8258). Typical job titles are fourdrinier machine operator, back tender, winder operator, supercalender operator and sheeter.

This is full-time work. The typical work week is 40 hours on a compressed work week allowing, for example, a four day on, four day off, cycle with 12 hour shifts. Exposure to dust and fumes is usual.

Education and Skills

When recruiting new production workers, most companies require little or no previous experience. Companies prefer to train new workers to their own production standards. The education requirements are fairly standard across the industry as most companies ask for a Grade 12 education. On-the-job training for one or more months is required for positions such as rewinder operator or paper coater. One to four years of related experience and on-the-job training is required for the more complex occupations. For example, several years experience in junior positions such as helper, winder operator and back tender within a pulp mill are required before being promoted to fourdrinier-machine operator.

The most prominent application of new technology in the pulp and paper industry is in the use of computerized process control equipment. Operators must be able to retrieve and enter data on the computer consoles and this requires keyboard skills and the ability to interpret information presented in various forms such as graphic, analog and numerical.

B.C. Job Prospects

In B.C. production is mainly of pulp and newsprint. The pulp and paper industry is sensitive to the world price for their products which has a definite cycle. Employment in this occupational group declined due to the recession of the early 1980s and due to pulp mill modernization. Indications are that employment fell by 25% from 1981 to 1987 when about 900 people worked in this small job group. However, industry sources suggest that the decline may be overstated. All sources agree that the next few years will be a period of growth due to the number of mills that are under construction. Higher productivity due to technological change may dampen predictions. However, growth is forecast at a rate of 2.8% annually, much greater than average. In the eight years to 1995 a total of 300 openings are expected with most being due to new job growth.

Women comprised 2% of employees in these occupations in 1986, up from none in 1971.

Earnings

The 1986 Census in B.C. indicated that the average annual earnings for all workers in these occupations were $35,600, and $38,200 for the 64% of full-time, full-year workers.

Hourly rates in this highly unionized industry vary according to the nature and complexity of the job; rates vary from $16.00 to $25.00 in 1989.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,180	890	1,110

Annual Growth 1987-1995: 2.8%

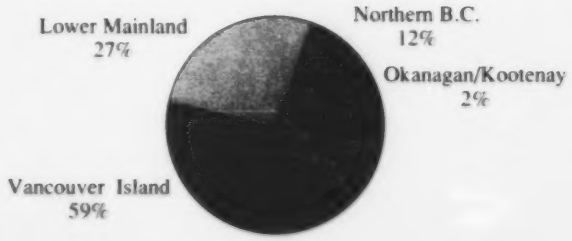
Main Industries of Employment 1986 Census

Pulp & Paper 90%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
210	90	300

Employment by Region



Occupations in Labouring and Other Elemental Work: Pulp and Papermaking 8258

Nature of the Work

Labouring and other elemental workers in the pulp and papermaking industry carry out the less skilled tasks for preparing pulp and processing it into paper and paperboard. The work is physical in nature and involves bending, lifting, carrying, or tendering simpler machines. These workers feed conveyers and hoppers, wash screens, clean machines and work areas, collect waste paper and pulp for reprocessing and perform other general duties. Some examples of job titles are: utility person, labourer and various helpers, tenders and feeders.

This is the usual entry position into a pulp mill from which progression into more specialized occupations begins. Regular employees work an average 40 hour compressed work week consisting of rotating 12 hour shifts, often on a four day on, four day off cycle.

Education and Skills

There are no specific education requirements for these jobs. As these positions are entry-level, only a few months of experience may be required. Training is on-the-job and usually lasts a few days. These workers need agility to work in awkward positions, such as stooping and kneeling while handling water hoses and other equipment to clean machines and work areas.

B.C. Job Prospects

Plant modernization in the early 1980s combined with a cyclical downturn led to a reduction in the number of labourers by up to 33% between 1981 and 1987. Industry sources suggest this measurement is overstated.

The forecast period, 1988 to 1995 should be more positive for the industry and for this occupation. The current projection is for growth of 2.7% annually over the period, a rate which is much higher than the average. With current employment just over 1,000 this is a medium size job group in B.C. A total of 360 positions are forecast to become available through to 1995, and over three-quarters will be new positions. This growth reflects the coming into production of the new pulp mills under construction in 1987 and 1988.

However, growth may be over-estimated as new mills use the latest technology and require fewer unskilled workers. Correspondingly greater demand for mechanics and highly skilled technicians will occur (see profiles SOC 8588 precision instrument mechanics; SOC 8535 electronic repairers; SOC 2165 engineering technologists and technicians; and SOC 2117 physical sciences technicians).

There were 55 women, or 4% of the total, in these occupations in 1986, as compared to less than 1% in 1971.

Earnings

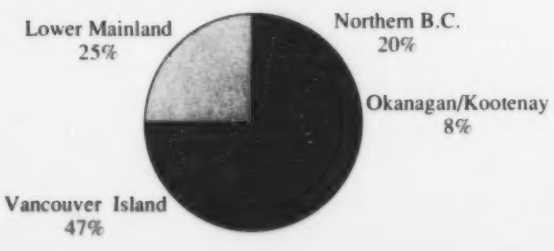
Hourly wage rates for labourers in pulp and paper mills were $15.33 in 1988.

According to the 1986 Census, average annual earnings in B.C. for full-time employees who worked the full year were $32,100.

Related Occupations

Papermaking and Finishing Occupations

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,560	1,040	1,290

Annual Growth 1987-1995: 2.7%

Main Industries of Employment 1986 Census

Pulp & Paper 92%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
250	110	360

Nature of the Work

A tool and die maker makes and repairs cutting tools, dies and fixtures subsequently used to cut, form or process materials, usually metal. From technical drawings and specifications they calculate required dimensions and tolerances, set up and operate metal-working machinery, machine the tools to close tolerances, apply heat treatments, assemble and test the tool or die, and verify the conformance of the finished product to specifications. In many shops, a tool and die maker may specialize in one or more of the above activities. More and more, they are required to operate numerically operated or computer programmable machinery.

The work is indoors and involves some exposure to noise and hazards requiring the use of safety equipment. Physical activities may include lifting and carrying of up to 23 kilograms, and periods of standing to handle material and machinery. A five-day work week of 40 hours is normal, and shift work may be required.

With experience and the appropriate aptitudes, a tool and die maker may move into a supervisory position, and additional formal training or education may allow further advancement.

Education and Skills

The tool and die maker apprenticeship lasts five years and includes 20 weeks of in-school technical training. Those who have completed the entry-level machinist program or the tool and die cooperative education program at BCIT or a community college receive partial technical training credit. Apprenticeship employers prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11. A basic knowledge of computers and electronics is helpful because of the increased use of computer controlled machine tools. For experienced machinists, BCIT offers a 14 week Computer Numerical Control (CNC) Program, which is useful in any industry which manufactures individual parts or requires limited production runs.

Compared with most other machining workers, tool and die makers have a much broader knowledge of machining operations, mathematics and blueprint reading, so high school or vocational courses in algebra, metalworking, physics and draughting usually help applicants land an apprentice position.

B.C. Job Prospects

With 1987 employment at 300, tool and die makers form a relatively small occupation in B.C. In normal economic times market conditions for these occupations tend to be better than average, and labour shortages have been frequent and persistent. However, employment suffered when the manufacturing sector, the main employer of tool and die makers, was hard hit by the recession in the early 1980s. From 1981 to 1987 employment declined by 10%.

While changing technology is requiring new skills, the use of computerized equipment has thus far only dampened employment growth. Annual growth will be higher than average, at 3% per year, through to 1995. Combined with openings from attrition of 90, there are expected to be 170 openings in the outlook period.

Over 70% of tool and die makers are employed in manufacturing, mainly in metal fabricating. Nearly all jobs are full-time. Tool and die makers can expect steady employment throughout the year.

In 1986 women represented 3% of all tool and die makers in B.C., up from 2% in 1981.

Earnings

Hourly rates of pay in Vancouver ranged from $18.00 to $19.36 in 1987 for unionized labour, and from $13.00 to $18.00 for non-union. Apprentices earn 60% of these rates to start, and their wages gradually increase during their apprenticeship, as they become more qualified and gain experience.

According to the 1986 Census, the 70% of full-time, full-year workers had an average employment income of $29,600.

Related Occupations

Machinists.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	330	300	380

Annual Growth 1987-1995: 3.1%

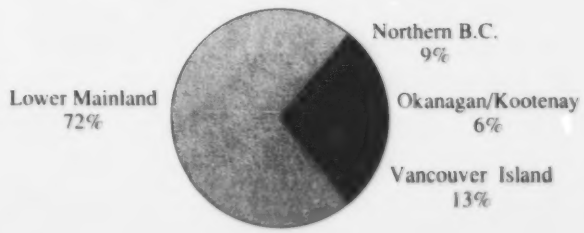
Main Industries of Employment 1986 Census

Metal Fabricating	41%
All Other Manufacturing	31%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
80	90	170

Employment by Region



Machinists and Machine Tool Setting-Up Occupations 8313

Nature of the Work

Machinists make or repair metal tools, machines or parts by using metal working equipment such as lathes, boring machines, milling machines and cutting machines. They must be able to read and understand part specifications, calculate dimensions and tolerances, do layout and mark out the piece for machining. Highly skilled, a general machinist is competent with a variety of metal working machines. There are also machinists who are specialized on certain types of machines or with particular materials. This category includes aircraft machinists, automotive machinists, cam makers, gear finishers, gear shapers, jig borers, lathe machinists, pattern makers and radial-drill-press operators.

A machinist works indoors, usually in areas that are noisy, dirty and potentially hazardous. Frequent lifting and carrying of objects is required, as are prolonged periods of standing. A five-day work week of 35 to 40 hours is standard. Shift work is usual.

Education and Skills

An eight month entry-level machinist trades program is available at several colleges. Graduates are prepared for entry-level work in the trade or to start the Machinist Apprenticeship Program. This apprenticeship lasts four years and includes five weeks of in-school technical training each year. Those who have taken the entry-level trades program mentioned above receive Level 1 technical training credit. Selkirk College also offers a two year cooperative Machinist Apprenticeship program, consisting of two six month study terms, each followed by a six month work term. Students are assisted in obtaining suitable work term positions in machine shops, mills and hospitals. There is also a four year Automotive Machinist Apprenticeship in B.C. with similar admission requirements. Apprenticeship employers prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11.

Machinists should have a mechanical aptitude in order to use the tools and machines required to build complex parts. They should also enjoy highly accurate work that requires concentration as well as physical effort. A basic knowledge of computers and electronics is helpful because of the increased use of computer-controlled machine tools.

B.C. Job Prospects

Employment in the machinist and machine tool setting-up occupational category suffered recession-related reversals in the early 1980s, declining 5% from 1981 to 3,190 in 1987. This is a fairly large occupation with future growth projected to be higher than the rate expected for the total labour force. About 1,260 openings will occur to 1995, about 60% of these due to employment growth.

Nearly all machinists work in full-time jobs. Two-thirds of machinists work in manufacturing industries, and overall employment in machinist and machine tool setting-up can be affected by changing economic conditions, especially as they affect manufacturing industries. During times of economic growth, sporadic shortages of machinists occur.

The increasing use of numerically-controlled and microprocessor-controlled machinery has changed the machinist's skill requirements to include the ability to set up and operate this equipment. The total employment impact of these innovations has been moderate, although negative, to date.

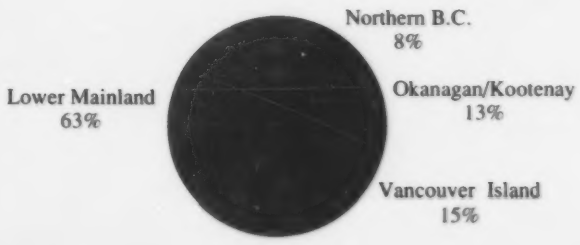
Between 1971 and 1986 the number of women machinists has increased from 45 to 75 comprising 2% of all machinists.

Earnings

The B.C. average employment income for the 62% full-time, full-year workers was $30,500, according to the 1986 Census.

In 1986 Vancouver area wages for fully qualified machinists varied from $12.00 to $19.00 per hour in non-union shops while union wages were up to $20.01 in manufacturing and $21.81 in construction. Apprentices start at 60% of the qualified rate, increasing over the term of their apprenticeship.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,370	3,190	3,930

Annual Growth 1987-1995: 2.6%

Main Industries of Employment 1986 Census

Metal Fabricating	35%
All Other Manufacturing	22%
Machinery Manufacturing	17%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
730	530	1,260

8319 Saw Repairers and Related Metal Machining Occupations
8393 Saw Filing Occupations

Nature of the Work

Occupations in this group are concerned with working with metal through machining or filing and grinding to make or repair metal equipment and tools. The most important occupation within this field in British Columbia is that of saw repairer, which covers various skills from simple and small saw repair to a highly skilled bench saw repairer who ensures that extremely large and complex sawmill saws are correctly set. This work entails inspecting saws for defects; cutting, straightening, and filing saw teeth; and welding new parts to saws, using machines or sometimes by hand.

Other activities within this occupational field are involved in operating machinery to polish metal products and parts.

Women are well represented in the small saw repair field and constitute 30% of those employed. They are less well represented in the major saw fitter/repairer field with 4% of employment.

Education and Skills

The Saw Fitter Apprenticeship lasts two years and includes four weeks of technical training each year. The Circular Saw Filer Apprenticeship lasts one year and applicants must have completed a Saw Fitter Apprenticeship or hold a Saw Fitter Trades Qualification (TQ) Certificate. The Benchman/woman Apprenticeship lasts one year and applicants must have completed a Circular Saw Filer Apprenticeship or hold a Circular Saw Filer TQ Certificate. Those who have not completed a formal apprenticeship in these trades require suitable experience for the period of the applicable apprenticeship term, plus one year, to be eligible to write the B.C. Certificate of Qualification (TQ Certificate) examinations. In the metal machining occupations, there is a four year Diesel Engine Machinist Apprenticeship. Students are advised that apprenticeship employers prefer applicants with a Grade 12 education that includes English 12, and a math and science 11.

B.C. Job Prospects.

The whole occupational field is of moderate size and is expected to grow at a lower than average rate. However, the saw repairer and fitter trades are extremely important in maintaining saws in lumber and other mills and have somewhat better growth prospects, especially at the higher skill level. Demand for fully qualified people is sometimes higher than the supply of those with suitable qualifications; shortages do occur mainly in the more northern areas in British Columbia.

Total job openings through to 1995 are also expected to be higher than the growth pattern caused simply by economic changes. There will also be a need to fill job openings which occur as current workers retire or leave this occupation. Requirements, including growth and replacement for retirement, are expected to amount to 340 job openings from 1987 to 1995.

People working in this occupational field are most likely to work in manufacturing firms. More specifically, saw repairers will work in metal fabricating, forestry and wood products manufacturing, and in the wholesale and retail trade industries. Employment for small saw repair workers is often seasonal and has a high part-time component. However most of those who are qualified saw fitters and repairers involved in manufacturing work full-time and full-year.

Earnings

Sawfilers are paid an hourly rate which varies from $8.00 per hour for small saw repair up to $18.30 per hour for unionized saw fitters and benchmen/benchwomen working in major industries.

The average annual employment income reported in B.C. for the major saw repairer occupational field in the 1986 Census was $31,300, and for those who were employed full-time, full-year, the average income was $35,381. These incomes are above the average of all workers.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,850	1,610	1,720

Annual Growth 1987-1995: 0.9%

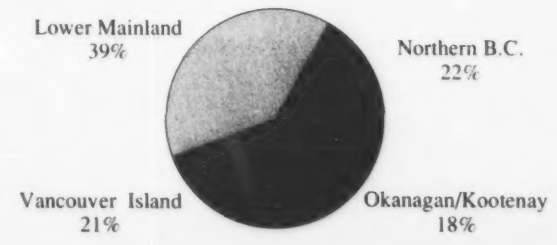
Main Industries of Employment 1986 Census

Wood Products Manufacturing	70%
Metal Fabricating	10%
Trade	4%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
110	230	340

Employment by Region



▶ Sheet Metal Workers 8333

Nature of the Work

This occupational group covers workers who fabricate products made of sheet metal. Most workers in B.C. are employed in the manufacturing and construction industries, where they make duct work, metal walls and siding, kitchen assemblies and roof drainage systems. Many sheet metal workers are employed in shops, where sheet metal assemblies are made before installation in buildings.

Sheet metal workers perform a variety of activities such as draughting patterns, measuring and laying out templates, cutting, shaping and fastening sheet metal (such as copper, steel and aluminum), and using hand tools and such machines as brakes, shears and rollers.

On construction sites they often work in cramped and awkward positions and, at times, work at heights. Most manufacturing or shop work is done indoors. Construction installation activity can be indoors or outdoors.

Sheet metal workers often work for specialty contractors and enjoy regular work schedules of 35 to 40 hours per week. Some are members of construction unions and work on a project-by-project basis, with work being allocated by a union hiring hall.

The number of women practicing the sheet metal trade has grown significantly during past years and they are encouraged to enter the trade.

Sheet metal workers tend to remain in their trade until retirement.

Education and Skills

Apprenticeship is the accepted means of entry into the sheet metal trade. BCIT offers a six month entry-level Sheet Metal Worker Program, which prepares students for entry-level work in the trade or to start the Sheet Metal Worker Apprenticeship. The apprenticeship term is four years and includes six weeks of in-school technical training each year. Those who have taken the entry-level trades program receive Level 1 technical training credit. Individuals who have not completed the formal apprenticeship must have five years of suitable experience to be eligible to write the B.C. Trades Qualification (TQ) Certification exam. Certification in this trade is compulsory in B.C. A two year Metal Cladding Apprenticeship is also available.

Students are advised that apprenticeship employers prefer applicants with Grade 12, including Algebra 11 and Physics 11.

Sheet metal workers should be in good physical condition and have a mechanical aptitude. Courses in trigonometry, geometry, mechanical drawing and shop provide a helpful background for learning the trade.

B.C. Job Prospects

Employment of sheet metal workers declined significantly during the recession which began in late 1981. Although growth is projected to be higher than average to 1995, pre-recession levels of employment are not expected to be reached by the end of the outlook period. Employment is expected to expand by approximately 360 new jobs; replacement needs will be opening up another 160 positions. When replacement demand is taken into account, and planned construction activity in Vancouver in particular, job prospects appear favourable. However, unemployment among sheet metal workers in B.C. is currently above average.

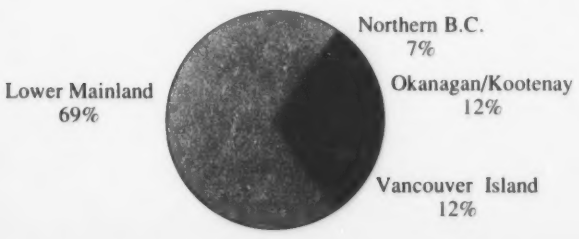
Employment in this relatively small occupational group is sensitive to changing economic conditions especially as they affect construction and metal fabricating. Employment is also subject to seasonal variations, with peaks during the warm weather months.

Earnings

The Canadian Construction Association reported that the basic union hourly wage rate for B.C. sheet metal workers in 1987 was $19.66.

According to the 1986 Census, workers in this occupation who were employed full-time, year-round earned an average annual employment income of $31,300.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,130	1,320	1,690

Annual Growth 1987-1995: 3.1%

Main Industries of Employment 1986 Census

Manufacturing	44%
Construction	36%
Transportation	6%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
360	160	520

8335 Welding and Flame Cutting Occupations

Nature of the Work

Welding and flame-cutting involves the joining and cutting of metals. There are numerous welder categories, depending on the type of welding equipment and techniques used, the nature of the final product and the degree of expertise required. Accordingly, designations such as arc welders, gas welders, combination welders, resistance welders, pressure vessel welders, welder-fitters, and flame cutters are used. Usually welders are required to know several welding techniques, although they might use only a few in their jobs.

Although production welders work primarily indoors, many welding positions call for work both indoors and outdoors. The physical demands of welding are heavy. Lifting and carrying heavy items are often required, as are prolonged periods of standing and crouching. A welder is exposed to very hot temperatures, noise, and fumes.

Women, who represent only a small proportion of the trade, are encouraged to enter the occupation through apprenticeship.

Education and Skills

Most community colleges offer welding programs, which are a combination of three welding trades training programs (Level C, B, and A). They provide the training required for B.C. Welder Certification. Each level is followed by on-the-job experience, which must be completed before certification. It takes up to ten months to complete Level C, four months for Level B and two months for Level A in addition to the job experience requirement. Applicants require Grade 10, with Grade 12 recommended.

Some colleges also have programs which include pipeline welding, welding fabrication, and autobody gas metal arc welding. Graduates can look for entry-level work or start the Welder Apprenticeship which lasts three years and includes 24 weeks of school-based technical training. Those who have taken entry-level trades training receive Level 1 technical training credit. There is also a four year Lead-burning Apprenticeship.

Those considering a welding trade need manual dexterity, good eye-hand coordination, the ability to concentrate on detailed work for long periods of time and to work in awkward positions. Courses in mechanical drawing, blueprint reading, physics and chemistry are also helpful. Apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

B.C. Job Prospects

Currently, employment for welders in B.C. remains below the 1981 level, but is expected to increase at an average rate through to 1995. Unemployment remains high, although there may sometimes be shortages of welders with special skills. Replacement needs could also open up a number of jobs and by 1995 approximately 8,000 workers are expected to be employed in this relatively large occupational group.

Future employment growth is expected to be adversely affected by technological changes. Increased use of robots in manufacturing plants will reduce the requirements for welding machine operators and production welders. Programmable cutting machines are already in widespread use. These innovations have limited opportunities for lower skilled welding occupations; prospects for highly skilled and specialized manual welders are better. Welding is also an important skill for many mechanical repair and metal working occupations. This tends to widen job opportunities.

Welders may be subjected to seasonal layoffs in manufacturing and construction. Employment can also be sensitive to fluctuations in general economic conditions.

Earnings

In 1987, Vancouver area welders earned between $13.58 and $19.70 per hour in union jobs and from $12.00 to $16.30 in non-union jobs.

According to the 1986 Census, in B.C. full-time, full-year workers in these occupations earned an average employment income of $32,100.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	8,780	6,830	7,920

Annual Growth 1987-1995: 1.9%

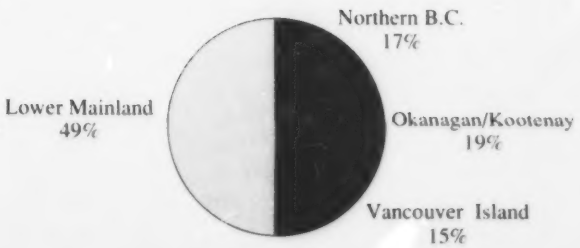
Main Industries of Employment 1986 Census

Manufacturing	50%
Construction	7%
Miscellaneous Services	15%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,090	730	1,820

Employment by Region



Boilermakers, Platers and Structural Metal Workers 8337

Nature of the Work

Workers in this occupational group construct, erect and repair boilers, tanks and large containment vessels, which are used in a variety of industrial settings, such as chemical and petrochemical manufacturing, pulp mills and oil and gas refining. Boilermakers fabricate smaller boilers and tanks or components of larger ones in a shop factory or shipyard. They also install or assemble boilers and containment vessels on site. In their work, boilermakers interpret detailed plans and make measurements for metal plates and tubes. They use a wide range of tools, including torches and grinders.

Working conditions are often cramped and uncomfortable and involve exposure to chemical vapours or wetness. When inside boilers and other vessels, boilermakers must often work at considerable heights and are exposed to high noise levels. Protective clothing and other safety gear is routinely used.

Women, who represent an increasing proportion of the trade, are encouraged to enter the occupation via apprenticeship.

Education and Skills

BCIT offers six month, entry-level, training programs in Boilermaking and Steel Fabrication which require Grade 10, with Grade 12 preferred. Graduates can look for entry-level work in the metal fabrication trades or start the Boilermaker or Steel Fabrication Apprenticeship. The Boilermaker Apprenticeship term is three years and includes eight weeks of school-based technical training. Completion of the entry-level training program is mandatory. Those who have not completed the formal apprenticeship must have four years of suitable experience to be eligible to write the B.C. Trades Qualification (TQ) Certification exam. There is also a four year Boilermaking (Shop Section) Apprenticeship, which does not offer TQ certification.

The four year Steel Fabrication Apprenticeship includes four weeks of in-school technical training each year. Those who have completed the steel fabrication program mentioned above receive Level 1 technical training credit. This trade offers TQ certification, so those who have not completed the apprenticeship must have five years of suitable experience to be eligible to write the TQ exam. A four year Ornamental Ironwork Apprenticeship is available for those who fabricate grills, railings and gates.

Apprenticeship employers in the metal fabrication trades prefer applicants with Grade 12, including English 12 and a math and science 11. Good health and the capacity to do heavy work are necessary to be successful in these occupations. Mechanical aptitude and the manual dexterity to handle tools are also important.

B.C. Job Prospects

Boilermakers form a very small occupational group in B.C. and since 1981 their employment has declined. Based on growth prospects for shipbuilding, pulp and paper and other construction projects, employment for this group is expected to reach its 1981 level of over 400 jobs by 1995. There will also be a small number of replacement openings as older workers retire or leave the trade.

While most boilermakers work in the manufacturing industry, such as in steel mills, or for utilities, about 10% can be found in shipbuilding. The construction industry employs roughly one in five.

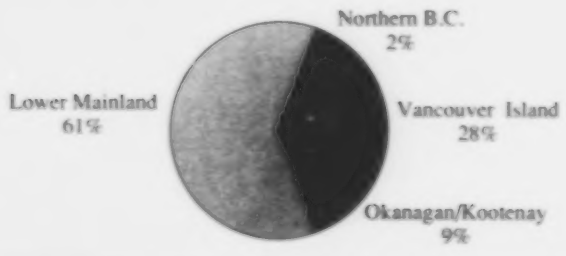
Employment is vulnerable to changing economic conditions. Currently in the province, unemployment for this group is well above the average for all occupations.

Earnings

The Canadian Construction Association reported that the 1987 hourly union wage rate for boilermakers was $19.33.

According to the 1986 Census the average employment income was $32,300 for full-time, full-year workers who account for about 20% of workers in B.C.. The average income for all workers was $24,000.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	420	330	420

Annual Growth 1987-1995: 2.9%

Main Industries of Employment 1986 Census

Manufacturing	43%
Construction	23%
Services & Government	21%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
90	30	120

85

Product Fabricating, Assembling and Repairing Occupations

▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼

▶ Electrical and Related Equipment Handling and Repairing Occupations 8533

Nature of the Work

Air-conditioning repairers, major appliance repairers and refrigerator repairers are typical workers in this unit. Industrial electrical maintenance and refrigeration systems repairers and installers are other highly skilled workers in this field. Aircraft electricians and automobile electricians are also described in this group but, increasingly, these functions are being incorporated into the fields of aircraft and automobile mechanics.

The major responsibilities of people who work in these occupations include installing, servicing, repairing and rebuilding industrial equipment and household appliances. The work includes a large amount of specialist electrical knowledge and requires familiarity with a wide range of diagnostic and repair equipment as well as being able to read technical drawings, wiring diagrams or blueprints. Increasing use of electronics components means that workers in these occupations are frequently expected to have a knowledge of electronics.

The work environment may vary from a factory to a customer's home and always requires good safety habits.

Maintenance electricians are included in this occupational group but are more closely matched with and follow the same training path as construction electricians. For information on this category see construction electricians (SOC 8733).

Education and Skills

An entry-level Electrical/Electronics Appliance Repair training program is offered by BCIT and several colleges. Graduates of this six to ten month program can look for entry-level positions in the trade or start the Electrical Appliance Repair Apprenticeship which lasts three years. Trades Qualification (TQ) Certification is mandatory for refrigeration mechanics and training is through four years of apprenticeship. Both the entry-level trades training program and apprenticeships require a minimum of Grade 10. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Training for small appliance repair is mostly on-the-job, supplemented by electrical or electronics courses from BCIT and the community colleges.

B.C. Job Prospects

Electrical equipment repairers work in various industrial sectors, but particularly in the wood products manufacturing, trade and construction sectors.

This occupational field is fairly large with 4,390 employed. Employment growth to 1995 is expected to be at about the average rate for all occupations. In addition, attrition will open up further opportunities. Total requirements through to 1995, including both growth and replacement needs, are expected to be about 1,360.

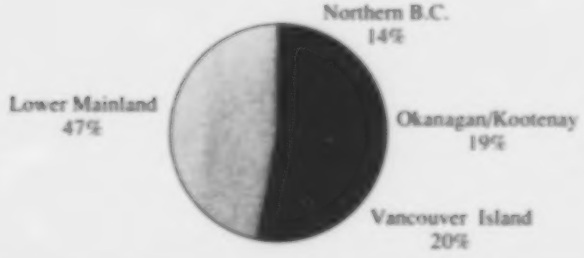
Some of the specific occupations within this field, especially those involved in industrial maintenance or refrigeration systems, often show shortages as demand outstrips the supply of qualified workers. These shortages most often occur in communities in northern B.C. and only rarely in the Vancouver area.

Earnings

Refrigeration mechanics and major appliance repairers are paid between $10.00 and $17.00 per hour, and industrial electricians receive from $14.00 to $21.00 per hour depending on the industry and if the position is unionized. People working in small appliance repair generally are paid from $7.00 per hour to $10.00 reflecting the non-unionized, small business environment.

The 1986 Census reported that this occupational group had an annual average employment income of $28,600, and $32,600 for full-time, full-year workers.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,140	4,390	5,050

Annual Growth 1987-1995: 1.7%

Main Industries of Employment 1986 Census

Wholesale & Retail Trade	22%
Construction	13%
Wood Products Manufacturing	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
660	700	1,360

8535 Electronic and Related Equipment Installing and Repairing Occupations

Nature of the Work

Electronic maintenance technicians, computer repairers and communication technicians are typical occupations in this group. Electronic equipment installers and repairers work on a variety of electronic equipment, including computers and peripherals, industrial computer controls, security systems, radio and television transmitters, and other electronic recording equipment. Repairers test electronic components and circuits to locate defects and then replace any faulty components and wiring. Work is usually indoors; many electronics technicians are involved in on-going maintenance for factories and others may provide repair services at different sites. While most electronic technicians are men, women are increasing their entry to the field.

Closely related fields are: Instrumentation Mechanics (SOC 8588), Wire Communications Installers (SOC 8735) and Radio and Television Repairers (SOC 8537).

Education and Skills

A one year entry-level Electronics Technician Program and two year Electronics Technology Program are available at several B.C. colleges. Admission requirements include Grade 12, with Algebra 11 and Physics 11. Poor colour vision may restrict entry. Course graduates may move into entry-level work in the trade or start an Electronics Technician Apprenticeship lasting four years with eight weeks of in-school technical training each year. Persons who have completed the entry-level program receive Level 1 technical training credit. Trades Qualification (TQ) Certification is not offered in this trade.

BCIT offers a six month Security Alarm Installer Program. Graduates move into entry-level work in the trade or enter the two year Security Alarms Installer Apprenticeship. People who do not complete this formal apprenticeship must have three years of suitable experience before being eligible to write the B.C. (TQ) Certification exam. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11.

Electronic equipment repairers with at least two years experience and who have received an accredited technician or technology certificate or equivalent may apply for membership as a certified technician with the Applied Science Technologists and Technicians of B.C. (ASTTBC).

B.C. Job Prospects

This occupational group is medium sized with approximately 1,800 persons employed, but each separate occupation within this group is generally quite small. Employment is projected as growing faster than average for this group because of the growth of the main user industries. The considerable expansion of computer and electronics systems in all resource, manufacturing, and trade industries as well as most offices means that electronic technicians are now employed in many sectors of the economy, but predominant employment areas are electrical products manufacturing, construction, communications sectors, business services and government. This increase in the use of electronics suggests that the standard projection is probably too conservative and that more new jobs will be created. There are always some added job openings when current workers retire or leave the field but, since this occupational field has a young workforce, these replacement needs will be limited. Total job openings, from growth and attrition, are conservatively estimated to total 540 from 1987 to 1995.

It should also be noted that many other occupational fields are increasingly requiring electronics technical backgrounds which acts to widen and increase the job market for people in this field.

Earnings

Income varies depending on employment area but the 1986 Census reported that this occupational group had an average annual employment income of $25,200. In B.C. 72% were full-time, full-year workers and earned an average of $29,400. Typical wage rates for electronics technicians and computer repairers vary from $8.00 to $16.00 per hour in the Vancouver area.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,450	1,780	2,130

Annual Growth 1987-1995: 2.3%

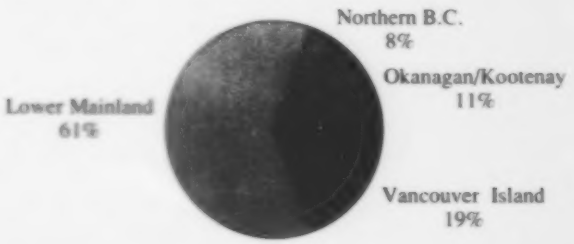
Main Industries of Employment 1986 Census

Business Services	14%
Government	12%
Electrical Products Manufacturing	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
350	190	540

Employment by Region



▶ Radio and Television Repairers 8537

Nature of the Work

Television and video repairers are major occupations in this group. Other jobs include sound-equipment servicing, radio electricians and television technicians. This work primarily involves diagnosing and testing faulty equipment and changing electronic and solid-state components. Work usually occurs indoors on the customer's premises or in a repair shop or factory.

While there are currently relatively few women in this field, the number of women entrants is increasing.

Education and Skills

Several B.C. colleges offer consumer electronics or video systems options within their basic electronics programs. Prerequisites generally are Grade 12, usually with Algebra 11 or 12 and Physics 11. Colour perception and ability to manipulate small tools are important aptitudes. Course graduates can look for entry-level employment in the trade or start an Electronics Technician (Consumer Products) Apprenticeship which lasts four years and includes eight weeks of in-school technical training each year. Those who have taken the entry-level program receive Level 1 technical training credit and employers normally prefer this training, or require Grade 12 completion with Algebra and Physics 11. Individuals who do not complete a formal apprenticeship must have five years of suitable experience to be eligible to write the B.C. Trades Qualification (TQ) Certification exam. Technicians need to keep abreast of changes in technology.

B.C. Job Prospects

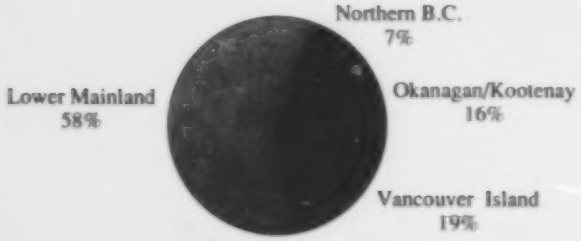
This occupation is a fairly small job field but employment projections suggest that employment growth will be faster than average following fairly fast growth over the 1981 to 1987 period. Replacement requirements will provide an additional avenue of entry into the occupation, as an above-average proportion of this workforce is in the 54-plus age category and is expected to retire by the end of the forecast period. Growth and filling these replacement needs should provide 570 job openings between 1987 and 1995. The majority of employment is found in retail trade, and other important industries for employment are wholesale trade, business and miscellaneous services, and radio and T.V. broadcasting.

The surge in new consumer video and television products over the past few years is expected to continue to build employment in this occupation. Demand for television technicians is also helped by the diversity of products now on the market and the complexity of equipment. But this growth may be contained somewhat by technology improvements which reduce failure and make repair easier. Unemployment is low and occasionally there are shortages of qualified persons. Employment is sometimes on a self-employed or owner-operated business basis, and there is a slightly higher pattern of part-time or part-year work than seen in many trades.

Earnings

The average annual employment income reported from the 1986 Census reflects part-time work patterns and, at $19,500, it is less than for many electronics trades. Average earnings for the 63% who were working full-time, full-year stood at $24,100. Typical hourly wages in Vancouver vary from $8.00 to $15.00 per hour.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,160	1,430	1,690

Annual Growth 1987-1995: 2.1%

Main Industries of Employment 1986 Census

Wholesale & Retail Trade	75%
Business and Miscellaneous Services	8%
Radio & Television Broadcasting	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
260	310	570

8541 Cabinet and Wood Furniture Makers

Nature of the Work

This group includes assemblers, bench carpenters and cabinet makers. Using blueprints, cabinet makers construct and repair wooden articles, such as furniture, office equipment, doors, window and door frames, and store fixtures. Quite often their artistic touch is as important as their woodworking skills. In the past, furniture was totally hand-made and cabinet and furniture making were very labour-intensive, skill-demanding trades. Today, however, as sophisticated machines and power tools perform many job functions, cabinet and wood furniture makers no longer have to be as highly skilled. Work settings for cabinet makers include factories and custom shops where workers are exposed to noise, vibration and dust. A five-day work week of 35 to 40 hours is normal.

An increasing number of women have entered the occupation in the last few years and they now account for 12% of all workers in this trade.

Opportunities for self-employment exist for individuals who also have good business sense and marketing skills and may want to specialize in a specific line of product. This option is especially attractive in more remote areas of the province, where employment opportunities may otherwise not be available.

Education and Skills

Several colleges offer six to eight month, entry-level, Joinery (Benchwork) Training Programs, requiring Grade 10 as a minimum for entry, but with Grade 12 preferred. Graduates can look for entry-level employment in the trade or start the Joinery Benchwork Apprenticeship, which takes four years and includes five weeks of school-based technical training each year. Those who have taken the entry-level Joinery Program receive Level 1 technical training credit.

Individuals who do not complete the formal apprenticeship must have five years of suitable experience to be eligible to write the B.C. Trades Qualification (TQ) Certification exam. Apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

A good hand and eye for close tolerances and exact fit is needed by a joiner, to ensure the strength and appearance of finished items.

B.C. Job Prospects

Cabinet makers experienced a large employment increase in the 1970s, but suffered substantial recession-related employment losses in the early 1980s. To 1995 employment is expected to grow at an average rate and about 340 new jobs should be created in B.C. for this group. There will also be approximately the same number of replacement openings, bringing total openings to 690 jobs from 1987 to 1995. The number employed is projected to reach 2,790 by 1995.

Through the 1980s cabinet makers have faced poor labour market conditions. Despite improvements in recent years, unemployment remains higher than average.

Cabinet makers are concentrated in the furniture and fixture industry and represent a fairly large job group. Employment in this area is vulnerable to changing economic conditions and seasonal factors. Only 36% of all workers are employed full-time, full-year, which is much below the average for all occupations.

Earnings

Cabinet makers who are not fully qualified earn between $5.00 and $7.00 per hour to start, while highly skilled workers may earn up to $17.00 per hour. Fully qualified workers, particularly master cabinet and furniture makers, earn as much as $35,000 per year. In 1987, rates for cabinet makers ranged from $11.19 to $16.79 (union) and $8.00 to $15.00 (non-union) per hour.

According to the 1986 Census the average annual employment income for full-time, full-year employment in this field was $18,800.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,100	2,450	2,790

Annual Growth 1987-1995: 1.6%

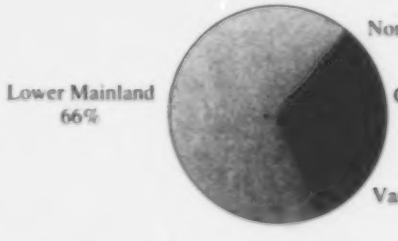
Main Industries of Employment 1986 Census

Wood Products Manufacturing	33%
Furniture & Fixtures Manufacturing	33%
Construction	15%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
340	350	690

Employment by Region



▶ Pattern Making, Marking and Cutting Occupations: Textile, Fur and Leather Products 8551

Nature of the Work

These occupations include designers, patternmakers and markers and various types of cutters and punchers. Patternmakers draw sets of master patterns for garments, footwear and upholstery. Using their knowledge of fabric and manufacturing processes, they determine the number, shape and size of pattern parts and the required amounts of material. They draw detailed outlines of the patterns on paper and then add size, identification and style information. Pattern markings are transferred to the appropriate material or fabric by markers, prior to cutting, assembling and fastening or sewing.

Typically, people in these occupations work in a factory or manufacturing environment and are often exposed to machinery noise. A normal work week is 35-40 hours and almost half of the workers are employed full-time, year-round. Women make up 60% of the workforce and approximately half of them work full-time.

Education and Skills

There are no specific education requirements for these occupations. Training is mostly on-the-job and lasts from one to six months for cutter positions. Patternmakers require one to two years of experience as a cutter followed by one year of on-the-job training.

Some individuals enter the pattern design and patternmaking fields after completing a Fashion Design Program as offered through Kwantlen College or private fashion design schools.

Workers in these occupations need good eye-hand-finger coordination and manual dexterity for laying out and cutting patterns along marked lines and to manipulate cutting tools rapidly and skillfully.

B.C. Job Prospects

Compared to Ontario and Quebec, the B.C. garment industry represents a relatively small share of total national employment (5%) and patternmaking is a small occupational group here. Only below average employment growth is expected for patternmakers through to 1995. However, replacement needs from attrition are expected to account for 60% of the 120 expected job openings.

Labour market conditions in the 1980s have been poorer than average and unemployment has been quite high since 1982. The clothing and textile industry which employs most of the patternmakers in B.C. is subject to foreign competition and must control costs to remain competitive.

The modernization of plant facilities, while boosting productivity also decreases employment opportunities. The new laser technology now being applied in cutting patterns is expected to reduce the number of cutting jobs. Economic conditions also have a great influence on employment in these occupations.

Earnings

Typical 1987 hourly wage rates for patternmakers, cutters and markers in apparel manufacturing were: fabric cutter (lead hand) $8.11; fabric cutter $7.64; marker (lead hand) $6.70; and marker $6.57.

According to the 1986 Census the average annual employment income in B.C. for all workers in these occupations who worked full-time and year-round was $17,800 and $13,200 for all workers.

Employment by Region

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	490	370	420

Annual Growth 1987-1995: 1.5%

Main Industries of Employment 1986 Census

Garment	78%
Leather & Textile	7%
Business & Personal Services	7%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
50	70	120

8553 Tailors and Dressmakers

Nature of the Work

Occupations such as custom tailor, dressmaker, costume maker and alterationist fall within this occupational category. Tailors make, alter and repair both made-to-measure and ready-to-wear clothing. Work includes designing, measuring, laying out, cutting, sewing, fitting, adjusting and finishing garments to the customer's body measurements. Many tailors and dressmakers are self-employed or work in small custom shops. In small shops, the tailor or dressmaker is involved in all functions, while in larger shops, there may be several who perform specific and somewhat repetitive tasks. In other cases, a tailor may only do alterations.

The work place is usually a pleasant, well-lit room where the noise from sewing machines is subdued. The hours of work are variable and depend on the requirements of the individual positions. Most people in this occupation are women (80%).

Education and Skills

Both the Dressmaking/Dress Designing and Tailor Apprenticeships last two years. Apprenticeship employers prefer applicants with Grade 12. Another option is to complete a community college program in fashion design that emphasizes garment production or tailoring. Kwantlen and Fraser Valley College offer one and two year programs in Fashion Design and Clothing Technology. Both programs require Grade 12 and sample garments for admission. There are also several private schools that offer fashion design and dressmaking courses. See also the profile for Interior and Product Designers (SOC 3313).

Tailors and dressmakers must enjoy exacting work requiring constant attention to detail. They should have good near vision to perform detailed work as well as eye-hand-finger coordination and manual dexterity.

B.C. Job Prospects

Job growth in this occupation was above average between 1981 and 1987 and projections to 1995 call for employment to continue to grow faster than average. This is a medium size occupational group in B.C. with the total number employed in 1995 expected to be about 1,440. This includes an estimated 230 new job openings and 500 replacement openings over this period. The large number of replacement openings reflects that the proportion of tailors and dressmakers in the 54-plus age group is twice as large as for all occupations.

Most opportunities will be in the retail trade (44% of workers), but there is a growing fashion design and manufacturing industry in B.C. Economic and seasonal factors moderately affect employment in these occupations. Many manufacturers of clothing now use computer-driven lasers to cut cloth. This innovation has changed the skills required by tailors and dressmakers in factory settings.

Although there is currently an above-average number in this occupation who are unemployed, employment for tailors and dressmakers in B.C. has expanded despite poor labour market conditions throughout the 1980s. The level of part-time employment is well above the provincial average.

Earnings

Earnings are influenced by the work performed, experience and the employing establishment. Factory workers are paid on a piece-work basis or, if they are unionized, their wages are negotiated through collective bargaining agreements.

Labour Canada reported the following 1985 average hourly wages: men's clothing ranging from $7.03-$12.83 and averaging $9.35; women's clothing ranging from $5.25-$11.23 and averaging $8.51.

The 1986 Census data indicates that the 36% of those in this occupational group who worked full-time, full-year in B.C. had an average income of $13,400.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,010	1,210	1,440

Annual Growth 1987-1995: 2.2%

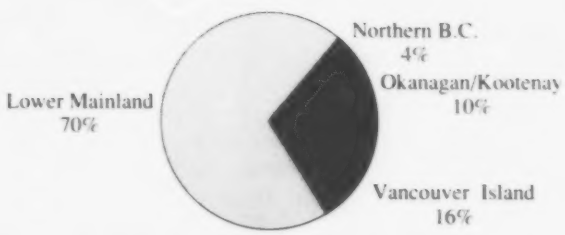
Main Industries of Employment 1986 Census

Clothing Retail Sales	44%
Specialty Shops	28%
Clothing Manufacturing	19%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
230	500	730

Employment by Region



▶ Upholsterers 8562

Nature of the Work
This group includes occupations concerned with making, rebuilding and repairing upholstered products such as chairs, sofas, automobile seats, cushions, mattresses, and casket interiors. Work includes cutting, forming, padding, stuffing, compressing, springing, tying, sewing, gluing, tacking and trimming textile, leather, plastic and various upholstery materials.

Upholsterers use hand and power tools, layout, match materials, plus mark and cut to a particular design or style. An important component of the job is the ability to discuss such matters as fabric, colour, style and cost with customers.

Education and Skills
The Upholstery Apprenticeship in B.C. lasts four years. For those who already have a good working knowledge of the upholstery trade, BCIT, offers a five month Upholstery/Custom Furniture Program. Many graduates of this program have started their own business.

BCIT also offers a five month entry-level Upholstery/ Auto Trimmer Program. Grade 10 is required and graduates may look for entry-level work in the trade or start the four year Automotive Trimming Apprenticeship. Those who have completed the entry-level trimming program receive Level 1 technical training credit.

Apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Upholsterers require good eye-hand-finger coordination and manual dexterity; spatial perception to visualize sizes and shapes; sufficient strength to perform light and medium lifting; and agility to work in awkward positions.

B.C. Job Prospects
The disruptive effect of the recession on this occupation is reflected by the decrease in the number of upholsterers in B.C. from over 1,300 in 1981 to 780 in 1987. However, projections to 1995 call for jobs to grow at the average rate for all other occupations. This small occupational group is expected to employ about 900 in B.C. by 1995. This reflects an estimated 120 new job openings and 130 replacement openings over the next seven years.

Unemployment in 1987 was average and this suggests that job prospects were as positive as in the majority of occupations.

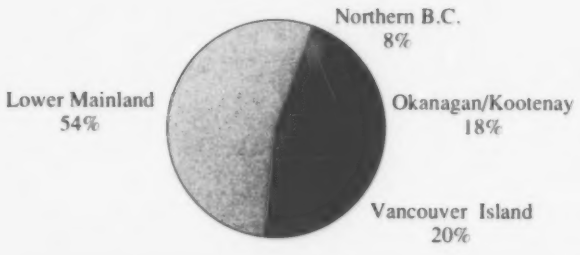
The number of women in this trade continues to grow. The 1986 Census data indicates that there are now 310 women upholsterers in B.C. which represents 31% of the jobs in this occupation. Part-time employment is lower than average. Technological change has had little effect on this occupation as upholstery requires detailed work that must be done manually. Also, since much of the work is re-upholstering antique or custom items, there are no gains from mass production techniques.

While the majority of upholsterers are employed by the furniture and fixture industry (67%), upholsterers are also employed in industries such as textiles (5%), transportation equipment manufacturing (5%), transportation (2%), wholesale trade (2%), retail trade (11%) and furniture repair and restoration shops (5%).

Earnings
The 1986 Census indicates that upholsterers who worked full-time over the whole year in B.C. earned, on average, an annual salary of $17,000.

A 1989 survey by Employment and Immigration Canada reported hourly wage rate ranges in the Vancouver area of $10.38 to $15.24 for union upholsterers and $6.00 to $9.00 for non-union upholsterers.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,330	780	900

Annual Growth 1987-1995: 1.8%

Main Industries of Employment 1986 Census

Furniture Manufacturing	67%
Furniture Retail Sales	11%
Furniture Repair and Restoration	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
120	130	250

Nature of the Work

This occupational group consists of motor vehicle mechanics, motorcycle mechanics, and heavy duty mechanics. They work for dealerships or garages, repairing and servicing gasoline or diesel-powered motor vehicles. Using tools and equipment, they test, diagnose, replace parts, tune, adjust and make body repairs. The work is indoors, where exposure to noise, fumes and odours is controlled by safety regulations. Mechanics normally work a 40 hour week, with shift and weekend work sometimes required.

Education and Skills

The entry-level programs offered by B.C. colleges are Automotive Body Repair; Automotive Painting and Refinishing; Automotive Mechanic; Commercial Transport Mechanic; Heavy Duty Mechanic; and Recreation Vehicle Technician. All of these, except Automotive Body Repair, are available as cooperative education programs. These programs integrate paid work experience with training and are planned for other mechanic programs in B.C. Training programs prepare students for entry-level jobs or apprenticeship in the motor vehicle trades. Graduates of the programs receive Level 1 technical training credit in the respective apprenticeship. Apprenticeship terms last two years for Automotive Painting and Refinishing and four years for Heavy Duty Mechanic, Automotive Mechanical Repair, the Commercial Transport Vehicle Mechanical Repair and Automotive Body Repair. Included are 15-24 weeks of school-based technical training, after which, apprentices receive the applicable B.C. Trades Qualification (TQ) Certification.

There are also four year apprenticeships available for Air Compressor/Pneumatic Tool Mechanic; Motorcycle Repair; and Front End Alignment/Frame Straightening. There are three year apprenticeships for Automotive Electric/Tune-Up; Radiator Manufacture/Repair; and Automatic/Standard Transmission Repair. The Front End Alignment/ Brake Service apprenticeship lasts two years. Apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

B.C. Job Prospects

Employment in these occupations declined slightly in the 1970s, but recovered during the first half of the 1980s. Slightly above average growth until 1995 is projected, with approximately 2,780 new jobs becoming available. Another 1,550 jobs will open up due to attrition. Employment is affected by economic conditions and seasonal factors, with unemployment being slightly below average for the entire field. There are frequent shortages for skilled autobody repairers and for mechanics with specialized electronics knowledge.

Employment in these occupations, which represent a very large job group in B.C., is concentrated in retail and wholesale trade. Demand for skilled mechanics continues to grow as the vehicle population increases and supply and demand should remain about equal with good employment opportunities in the dominant industries. When new vehicles sales drop off, the volume of service work remains and can increase, because older vehicles are kept running longer.

New developments in engines, transmissions and suspension systems, and increased use of electronic components are changing the mechanic's job into that of a technician, with emphasis on vehicle diagnosis. This will increase the demand for automotive mechanics with training in propane and electronic fuel injection engines, onboard computers and electronics.

Earnings

In 1989, wages for auto mechanics ranged from $14.88 to $18.94 an hour for union employees and from $10.00 to $18.36 an hour for non-union.

The average annual earnings in B.C. were approximately $19,900 in 1986. Most (55%) were employed full-time, full-year, and this groups' average income was $25,500.

Related Occupations

Autobody Customizers; Automotive Repair Service Estimators and Aircraft Mechanics.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	15,920	15,780	18,560

Annual Growth 1987-1995: 2.1%

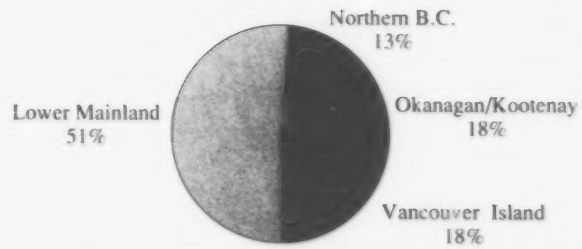
Main Industries of Employment 1986 Census

Retail & Wholesale Trade 80%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,780	1,550	4,330

Employment by Region



▶ Aircraft Mechanics and Repairers 8582

Nature of the Work

Aircraft maintenance engineer, aircraft structural mechanic and helicopter mechanic are examples of occupations in this group. Aircraft mechanics perform scheduled maintenance and repair on all aircraft systems and equipment, checking off a list of functions before each flight, in accordance with air transport regulations. A licensed aircraft maintenance engineer (AME) certifies that the aircraft, engines and components are fit for flight. These operations, which are carried out mostly in hangars, expose workers to noise, vibration, fumes and other hazards requiring the use of safety equipment and clothing.

A large percentage of aircraft mechanics work full-time, full-year. Part-time employment is almost non-existent. A five day, 40-hour work week including shift work and overtime is normal. The age structure of the occupation changed during the 1980's, as the proportion of people under 25 decreased.

Education and Skills

BCIT (Sea Island Campus) and Northern Lights College offer entry level Aircraft Maintenance and Avionics programs which require Grade 12 with Physics 11 and Algebra 11 or 12. Program completion assures 18 months credit toward the Aircraft Maintenance Engineer (category "A", "R", or "E" license). Graduates can look for work as junior aircraft maintenance employees or start the three year Aircraft Maintenance Mechanic Apprenticeship. After a further 18 months experience, the individual should be eligible to write the respective licensing examination. Apprenticeship employers prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11.

BCIT also offers a 900 hour Aircraft Structures Program which prepares students for employment in the aircraft manufacture and repair industries. Northern Lights offers a 36 week Rotor Technology training program in helicopter maintenance and repair.

Aircraft mechanics must do careful and thorough work which requires high mechanical aptitude. They should have good colour vision and hearing as well as strength and agility and must not be afraid of heights since they may work on the top of jet wings and fuselages.

B.C. Job Prospects

Employment of aircraft mechanics is concentrated in the air transport and aircraft and parts manufacturing industries, and varies with changing conditions in the overall economic climate. Seasonal factors affecting employment are slight, although a modest employment peak occurs during the summer months. Administrative changes in the industry caused by deregulation will likely increase the growth rate over the period to 1995. In B.C. aircraft mechanics represent a relatively small job group.

The recession caused an easing of training and recruitment of apprentices. In 1987 unemployment in these occupations was well below the average. Better than expected economic growth in 1988, rapid tourism growth and increased transportation tied to resource developments have combined to increase the demand for workers substantially, resulting in some shortages. In addition, according to the age structure of this occupation, 130 replacement openings should at least match new job openings to 1995.

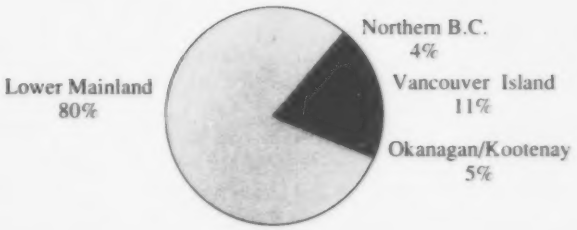
Earnings

In 1985, aircraft instrument mechanics' wages ranged from $13.04 to $14.39 per hour, averaging $13.76. Aircraft engine mechanics earned from $10.04 to $14.08, the average being $12.72 per hour.

Reported 1988 earnings for aircraft maintenance engineers ranged from $12.00 to $16.50 per hour for non-union positions, while unionized workers earned between $13.33 - $17.46 per hour.

According to the 1986 Census, the 64% of all B.C. workers who were employed full-time, full-year earned an average of about $31,700.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,110	1,450	1,570

Annual Growth 1987-1995: 1.0%

Main Industries of Employment 1986 Census

Air Transportation	83%
Aircraft Manufacturing	6%
Federal Government	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
120	130	250

8584 Millwrights, Industrial, Farm and Construction Machinery Mechanics and Repairers

Nature of the Work

This group includes occupations concerned with repairing, adjusting and servicing a variety of industrial, construction and farm machinery. Typically a person in this field is called a heavy-duty mechanic when working with construction, logging or mining equipment, or a millwright when working on industrial equipment. Work activities include disassembling, aligning, fitting and machining parts as well as installing and adjusting to specification with hand or power tools.

Heavy duty mechanics and millwrights also assemble, install, repair and maintain equipment involving hydraulics, pneumatics and electronics. Some activities occur outdoors in industrial and commercial settings. Other work is indoors at industrial plants or commercial and institutional buildings, where noise, vibrations and other hazards are common. The work week is normally five days, or 35 to 40 hours, and includes some shift work and overtime.

Education and Skills

B.C. colleges offer entry-level Heavy Duty Mechanics and Millwright Programs. A minimum of Grade 10, preferably Grade 12, is required and graduates can look for entry-level work in the trade or start an apprenticeship. Heavy Duty Mechanic and Millwright Apprenticeships last four years with five weeks of school-based technical training each year. Graduates of entry-level programs receive Level 1 technical training credit. Also available are four year apprenticeships in Maintenance Mechanics and Farm Machinery Mechanics. An entry-level, Diesel Engine Mechanics Program is offered at several community colleges.

Apprenticeship employers prefer applicants with Grade 12, including English 12 and math and science 11. In the logging and wood products fields some apprentices start in other entry-level jobs to obtain enough experience to bid for apprenticeship openings.

Mechanical aptitude and manual dexterity are important qualifications for workers in this trade. Good physical condition and agility are also necessary because heavy lifting and climbing may sometimes be required. Mechanics must not be allergic to solvents and lubricants.

B.C. Job Prospects

Employment prospects have improved for industrial mechanics along with improvements in the mining and forest industries. Unemployment has declined significantly since the mid-1980s and currently stands at an average level. Shortages do occur for millwrights and, sometimes, for heavy duty mechanics, but mostly in northern areas of B.C.

Slightly below average employment growth is projected to 1995 for this group which will produce about 1,540 new jobs, plus 1,870 to meet replacement needs. Economic conditions affecting the B.C. forest and mining industries are always considered when trying to assess employment opportunities.

Approximately 40% of industrial mechanics are employed in the forestry and wood industries, while 13% are employed in mining. With approximately 14,000 workers in 1987, these occupations constitute a very large job group. About 60% of all workers are employed full-time, full-year, which is well above the average for all occupations. A significant number of employment opportunities are located outside the major urban areas, at remote logging, mining or construction sites.

Earnings

In 1987, heavy-duty equipment mechanics in Vancouver earned between $12.16 and $19.13 per hour in union jobs and $11.00 to $18.00 per hour in non-union positions. Millwrights in Vancouver earned $13.95 to $19.85 per hour (union) and $12.00 to $16.00 per hour (non-union).

According to the 1986 Census, the average annual employment income for the 62% of B.C. workers who worked full-time, full-year was $37,100.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	15,880	13,810	15,350

Annual Growth 1987-1995: 1.3%

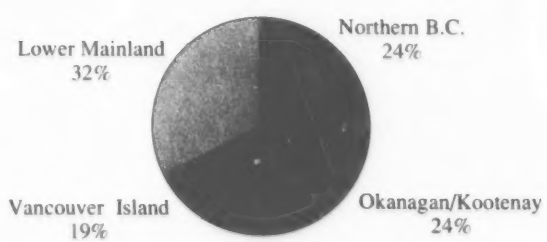
Main Industries of Employment 1986 Census

Wood, Pulp & Paper	31%
Mining	13%
Forestry	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,540	1,870	3,410

Employment by Region



Business and Commercial Machine Mechanics and Repairers 8585

Nature of the Work

Adding-machine servicer, photocopy machine servicer and typewriter mechanic are typical examples of occupations in this classification. Repairing mechanical and electronic business machines involves disassembling them, replacing broken parts, making adjustments and reassembling the equipment. Office machine servicers also maintain and inspect equipment during routine calls, which requires some travel. When necessary, extensive repairs are done at a central shop by qualified repairmen. The work week is usually five days, 35-40 hours. Seasonality is not a major factor in this occupation, which is evident in the high percentage of workers who are employed full-time, full-year.

Business and commercial machine mechanics and repairers are frequently required to service conventional as well as electronic and computerized equipment.

An increasing number of women have entered the occupation over the last few years and they now account for almost 3% of the total workforce in this group.

Education and Skills

In B.C. there is a four year Office Machine Mechanics Apprenticeship Program, which covers the repair, adjustment, and replacement of parts of mechanical or electronic machines used in an office. Apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Because of the increasing complexity of commercial machines, a basic knowledge of electronics is a definite advantage. Good manual dexterity, good vision and the ability to understand mechanical processes are desirable characteristics.

B.C. Job Prospects

Current projections to 1995 for this group suggest below average employment growth as the more conventional business and commercial machines are displaced by computer equipment. Job openings are expected to amount to 200, with 80 coming from growth and 120 from replacement needs. More job opportunities are expected in the electronic and related equipment installing and repairing occupations (see profile SOC 8535) than in this occupational group. As well, electronic installing/repairing has a larger employment base.

Most of the employment in this small occupational group is concentrated in trades, manufacturing and business services. Unemployment has traditionally been well below the average rate for all occupations.

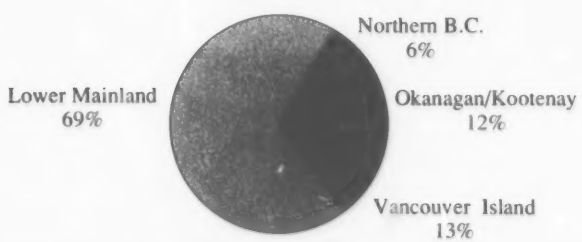
Earnings

Salaries for office machine servicers depend on the organization for which they work and on the type of machine they service. Since persons employed by independent service organizations repair and service a variety of machines, their earnings tend to be higher than those of repairers employed by manufacturers or distributors of a particular brand of equipment. Also, typewriter and adding machine servicers tend to earn less than those working on more sophisticated electronic machines.

On average, servicers earn $18,000 to $21,000 per year. The 1986 hourly rate for non-union office machine repairers in Vancouver ranged from $7.00 to $12.00. Union employees earned $12.60 per hour on average.

According to the 1986 Census the average annual employment income for the 73% of B.C. employees who were full-time, full-year workers in these occupations was $25,400.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,110	1,180	1,260

Annual Growth 1987-1995: .9%

Main Industries of Employment 1986 Census

Retail & Wholesale Trade	55%
Manufacturing	14%
Business Services	16%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
80	120	200

8588 Industrial (Precision) Instrument Mechanics and Repairers

Nature of the Work

This occupation includes camera repairers, gyroscopic instrument mechanics, and surgical-instrument repairers. However, in B.C., the industrial instrumentation mechanic is the most common occupation in this group. These people repair, overhaul, and calibrate precision devices used to measure and record such characteristics as temperature and density in the control or automation of industrial processes. They install instruments in control panels and aircraft and connect them to hydraulic, pneumatic, and electrical lines; calibrate instruments for accuracy; inspect and test instruments to isolate faults; and disassemble, clean and replace parts and reassemble instruments.

Most instrument service centres are clean, well-lit, and often air-conditioned. However, technicians who service instruments that control manufacturing processes may be exposed to noisy, dusty or warm conditions. A five-day work week of 35-40 hours is normal. Some shift work and overtime in the evenings and on weekends may be necessary.

Education and Skills

To become an industrial instrument mechanic and repairer in B.C., individuals must complete a five year Industrial Instrumentation Apprenticeship Program. Apprentices require a post-secondary electronic technician course before starting. In B.C. all apprentices must write and pass the appropriate Interprovincial Standards Examination (not all trades have one) before being eligible to receive their apprenticeship completion and Trades Qualification (TQ) Certificates. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11.

Technicians and mechanics in this occupation must have extensive knowledge of the physical sciences as well as familiarity with electrical, electronic and mechanical engineering principles. In some firms, a college diploma may be required. Employers provide training to familiarize new employees with the firm's products and instruments.

People in this occupation must be detail-oriented, be able to give and receive instructions and to pay meticulous attention to safety procedures and control systems.

B.C. Job Prospects

The employment of instrumentation mechanics is concentrated in the B.C. manufacturing sector. Future employment opportunities are favourable, based on the outlook in this area. Employment prospects are moderately affected by economic conditions but not usually by seasonal factors. Long-term employment growth was interrupted by recession-related losses in the early 1980s.

This is a small occupational group which has had lower than average unemployment. A moderate increase in new job opportunities is projected to 1995 as a result of new developments in pulp and paper and automation in existing plants. Only light replacement demand is expected.

Labour market conditions have improved in recent years, although they are not as favourable as prior to the 1981-1982 recession. Almost three quarters of the workers in these occupations were employed full-time, full-year in 1986, which is well above the average for all occupations. Current unemployment rates are about average. Shortages are normally found in the northern areas of B.C.

Earnings

The average annual earnings of this job group was approximately $29,600 in 1986. Nearly 75% in B.C. were employed full-time, full-year, and these workers' average employment income was $33,700.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	590	520	590

Annual Growth 1987-1995: 1.6%

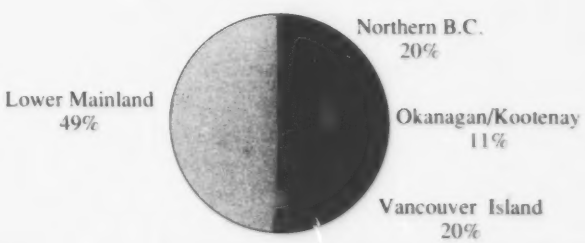
Main Industries of Employment 1986 Census

Manufacturing	41%
Retail & Wholesale Trade	20%
Services & Government	18%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
70	60	130

Employment by Region



Other Mechanics and Repairers 8589

Nature of the Work

This occupational group includes a wide range of mechanics, repairers and maintenance workers generally involved in the maintenance of smaller equipment. Typical jobs are furnace repairer, locksmith, lawnmower repairer, vending machine mechanic, and bicycle repairer. Also included are some general maintenance workers for industrial and mining equipment such as pumps and portable generators.

A five-day work week of 35 to 40 hours is normal, although being on call is usually part of the job, especially for home-heating furnace repairers. Travel from one repair job to another is often a requirement.

The representation of women in this occupational group has grown to 120 workers, or 5% of this occupation.

Education and Skills

Because of the wide range of jobs, training routes are varied and may be on-the-job, such as for a locksmith or vending-machine servicer, or through an apprenticeship program. In B.C. there is a two year apprenticeship in Power Saw Repair; four year apprenticeships in Diesel Fuel Injection, Small Engine Repair, and Air Compressor/Pneumatic Tool Mechanic; and a five year Apprenticeship in Hydraulic Servicing. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

The only entry-level trades training program available for these trades is an eight to ten month Small Engine Mechanics Program available at most colleges. Graduates receive appropriate technical training credit in the apprenticeship program. There is also a Fire Apparatus Mechanics Program offered at Selkirk College.

To keep up with improved technology, mechanics and repairers must continually study the repair books and technical manuals that accompany new equipment.

B.C. Job Prospects

Job growth in this occupation was below average between 1981 and 1987 but projections call for improved employment prospects with an average rate of growth through to 1995. This is a fairly large occupational group in B.C. with the number employed in 1995 expected to be about 2,750. This will include an estimated 310 new job openings and 430 replacement openings. This large number of replacement openings reflects that there are an above-average proportion of employees over 54 years of age.

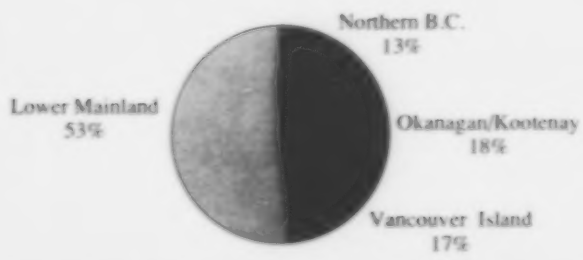
Workers in this category are employed in the business services (23%) retail trade (22%) and manufacturing (22%) sectors. The services sector is expected to continue to grow relative to other sectors of the economy. As in the past, economic conditions may influence employment. While the incidence of part-time employment has increased, it remains below average.

Several of the occupations in this field offer opportunities for self-employment.

Earnings

The 1986 Census data indicates that the 55% of all workers in this occupational group who worked full-time over the full-year in B.C. earned an average annual salary of $26,400.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,510	2,430	2,750

Annual Growth 1987-1995: 1.5%

Main Industries of Employment 1986 Census

Business and Misc. Services	23%
Retail Sales	22%
Various Manufacturing	22%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
310	430	740

8591 Jewellery and Silverware Fabricating, Assembling and Repairing Occupations

Nature of the Work

Diamond cutter, embosser, gemologist and silversmith are typical occupations in this group. Jewellers make and repair precious and semi-precious metal jewellery. Some specialize as repairers, engravers, gem and diamond setters, designers, enamelists or sample makers. They may reshape and restyle old jewellery following designs or instructions. Others make jewellery designs, creating metal models for casting workers. Activities carried out by jewellers include cutting, filing, soldering, grinding and polishing. Jewellers may work in retail stores, in trade shops operated by wholesalers or in jewellery factories.

Most jewellers are men, but the number of women has been increasing and now account for 31% of the jobs in this occupation.

Education and Skills

The four year Jeweller and Goldsmith Apprenticeship Program in B.C. includes 150 hours of in-school technical training. There is also a five year Silversmith and Plating Apprenticeship. Apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Vancouver Vocational Institute offers a five month Jeweller and Goldsmith Apprenticeship Program which covers jewellery design and manufacture; retail and wholesale jewellery sales; industrial application of precious metals and stones; and custom jewellery for private individuals. Grade 10 or equivalent is required.

Private schools also offer gem and diamond knowledge and appraisal training, and in Toronto, the Canadian Jewellers Association offers courses in jewellery design, manufacture and repair.

The precise and delicate nature of jewellery work requires finger and hand dexterity, good eye-hand coordination, patience and concentration. Artistic ability is an asset.

B.C. Job Prospects

This is a small occupational group in B.C. with just over 600 currently employed. Current projections based on the outlook for manufacturing call for above average employment growth. In the next seven years, approximately 230 job openings are anticipated. This includes an estimated 120 new job openings and 110 replacement opportunities.

While many of the workers in this occupation are employed in retail sales (50%), others are employed by the jewellery and silverware manufacturing industry (44%). Labour market conditions for jewellery fabricators have improved in recent years, although they are not as favourable as prior to the 1981-1982 recession. Unemployment among jewellery fabricators in 1987 was about average.

In the past, employment of jewellery fabricators has been susceptible to fluctuating business conditions. Seasonal forces, however, have little influence. Part-time employment in 1986 was about averge.

Earnings

Jewellers are paid on either a piece-work or a salary basis. Engravers, for example, are paid according to a "price per letter", while diamond setters often receive a "price per stone". Incomes vary according to expertise and skills, and range from $14,000 to $30,000 per year.

The 1986 Census data indicates that the 45% of all jewellers who worked full-time over the full-year in B.C. earned on average an annual salary of $19,000.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	550	610	730

Annual Growth 1987-1995: 2.3 %

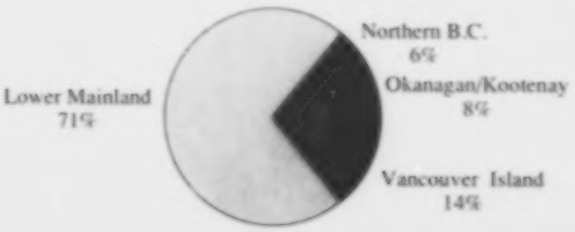
Main Industries of Employment 1986 Census

Jewellery Retail Sales	50%
Jewellery Manufacturing	44%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
120	110	230

Employment by Region



Marine Craft Fabricating, Assembling and Repairing Occupations 8592

Nature of the Work

This group includes several different occupations, but in general they build, repair, fabricate, and assemble metal, wood or fiberglass marine craft. Activities include: layout, marking and shaping parts; aligning, fitting and fastening fabricated parts and components; installing and repairing engines, auxiliary machinery, accessories, rigging and equipment; making adjustments using common or special hand and power tools, jacks, lifting and other equipment. Some are involved in major shipbuilding and many are involved in small craft fabrication or engine repair.

Work in this trade often involves making service calls and being outdoors. Working conditions include dampness, noise, vibration, exposure to liquids, fumes, odours, and other hazards which require the use of safety equipment.

Education and Skills

The level of skill required varies according to the occupational specialty and the type of marine craft being built or repaired. There is only one entry-level training program available for these trades, the Inboard/Outboard Mechanic Program at BCIT. However, B.C. colleges offer programs in welding, machining, steel fabricating, joinery and marine engineering, which provide the basic preparation for entry. Other required skills are then developed through on-the-job training.

The recommended route is a four year Apprenticeship in Boatbuilding, Shipfitting, or Inboard/Outboard Mechanical Repair, which includes from 16 to 20 weeks of in-school technical training. Those who have not completed the formal apprenticeship must have five years of suitable experience before being eligible to write the B.C. Trades Qualification (TQ) Certification exam. There are four year apprenticeships in Marine Engine Mechanical Repair, Machine (Engine) Fitter, and Shipwright (indenture in the Shipwright trade is restricted to the Ship Repair Unit, Canadian Forces Base, Esquimalt). There is also a five year apprenticeship for Loftsman/woman.

Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11.

B.C. Job Prospects

These occupations are primarily used in shipbuilding and repairing, and in manufacturing of transportation and other equipment, and in these areas the employment outlook appears favourable. Major shipbuilding now has potential in B.C. Investment in water transportation, fishing and projects sponsored by the Department of National Defence will provide growth in the short term after a slack period. Employment of small marine craft fabricators has been good, because some B.C. companies have developed a reputation for recreational and other small craft.

Shipbuilding is increasingly applying laser technology to welding and cutting of heavy steel and steel alloys. Technological changes require new skills to operate the new equipment and machinery and retraining is required.

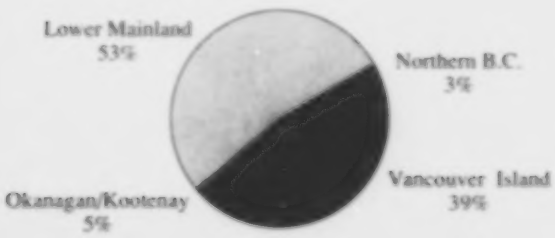
Job growth in this occupation was above average between 1981-1987, but projections to 1995 call for a growth rate slightly lower than the average. This is a medium size occupational group with the number employed in 1995 expected to be about 4,000, reflecting an estimated 410 new jobs and 540 replacement openings over the next seven years.

Temporary and seasonal employment is common, especially in repair of inboard/outboard motors. Unemployment in 1987 was at the average for all occupations.

Earnings

According to the 1986 Census, the 38% of all B.C. workers in these occupations who worked full-time, year-round had an average employment income of $29,000. The average for all workers in this group was $21,530, which reflects the part-year employment of those in small craft repair and maintenance.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,820	3,580	3,990
Annual Growth 1987-1995:		1.4%	

Main Industries of Employment 1986 Census

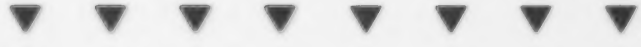
Shipbuilding & Misc. Transportation	69%
Fishing	9%
Federal Government	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
410	540	950

87

Construction Trades Occupations



▶ Excavating, Grading and Related Occupations 8711

Nature of the Work

This group includes the operators of various types of excavating and grading equipment, such as horizontal earth-boring machines, bulldozers, power shovels and dredging machines. Aside from operating the machines, operators are often expected to do routine maintenance, minor repairs, and change shovels, blades or other attachments.

Work is carried out on construction sites or roadways in all types of weather. Those employed by contract to local governments often work through the winter months removing snow from roads and airport runways. Other areas of work can include barge or shore dredging of waterways. Work is often on a project basis.

Most people enter these occupations after completing a formal training program or by promotion from a labourer position. Once there, they tend to stay until retirement. This occupation is almost totally dominated by men, although women are increasing their participation. Seasonality is a factor with less than half working full-time, year-round.

Education and Skills

In the past, most heavy-duty equipment operators were trained on the job, but many colleges now offer courses in operating the more technically advanced machinery. Malaspina College, for example, offers a sixteen week Heavy Equipment Operator Course. Applicants must be 19 years old, amenable to rugged working conditions and have at least a Class 5 driver's license. Grade 10 completion is required.

Workers must be physically strong, have good vision, fast reflexes and be able to read grade plans and use grade stakes in measuring the amount of earth to be moved. Mechanical dexterity is required, since many equipment attachments are hydraulically or pneumatically operated. Operators need stamina as they often have to sit for long periods of time on vibrating or bouncing machinery. They must also be able to tolerate high noise levels.

B.C. Job Prospects

Growth in this occupation was above average in the 1970s, but the recession in the early 1980s resulted in large layoffs. Long-term employment prospects depend on the outlook for the provincial economy, especially major projects such as new mines, roads, bridges, utilities, and other industrial and commercial ventures. The provincial highways program proposed for 1987 to 1995 is expected to provide increased job opportunities.

Workers are generally employed in construction and, to a lesser degree, in forestry, mining and services. Since these industries suffer from a boom-and-bust cycle and construction is seasonal, those in this occupation should expect periods without work.

Above average unemployment is common for this group, but a strong economy could increase opportunities for temporary jobs and overtime. It is expected that during the period to 1995 about 1,130 new jobs will be created. Replacement needs will open up another 770 jobs and by 1995 an estimated 6,400 workers will be employed in this group.

Technology will continue to provide more sophisticated equipment enabling operators to be more productive and perform their work with greater precision. However, since this type of equipment will also call for higher skills, operators will have to upgrade their technical knowledge.

Earnings

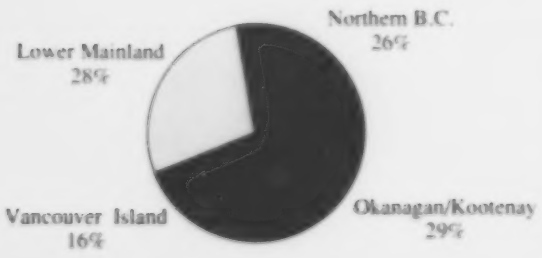
Union, heavy-duty equipment operators in the Vancouver area earned between $15.57 and $19.40 per hour in 1987. The maximum for non-union operators was $16.00. In the Vancouver construction industry the basic hourly rate was $18.84 in 1986.

According to the 1986 Census, the 38% of B.C. workers who were employed full-time, full-year earned an average employment income of $31,400.

Related Occupations

Yarding Engineers, Bridge Crane Operators and Conveyor Operators.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	6,440	5,270	6,400

Annual Growth 1987-1995: 2.5%

Main Industries of Employment 1986 Census

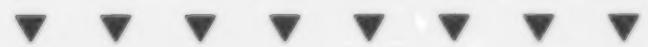
Construction	45%
Mining	13%
Miscellaneous Transportation	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,130	770	1,900

87

Construction Trades Occupations



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Most people enter these occupations after completing a formal training program or by promotion from a labourer position. Once there, they tend to stay until retirement. This occupation is almost totally dominated by men, although women are increasing their participation. Seasonality is a factor with less than half working full-time, year-round.

Education and Skills

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Workers must be physically strong, have good vision, fast reflexes and be able to read grade plans and use grade stakes in measuring the amount of earth to be moved. Mechanical dexterity is required, since many equipment attachments are hydraulically or pneumatically operated. Operators need stamina as they often have to sit for long periods of time on vibrating or bouncing machinery. They must also be able to tolerate high noise levels.

B.C. Job Prospects

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Workers are generally employed in construction and, to a lesser degree, in forestry, mining and services. Since these industries suffer from a boom-and-bust cycle and construction is seasonal, those in this occupation should expect periods without work.

Above average unemployment is common for this group, but a strong economy could increase opportunities for temporary jobs and overtime. It is expected that during the period to 1995 about 1,130 new jobs will be created. Replacement needs will open up another 770 jobs and by 1995 an estimated 6,400 workers will be employed in this group.

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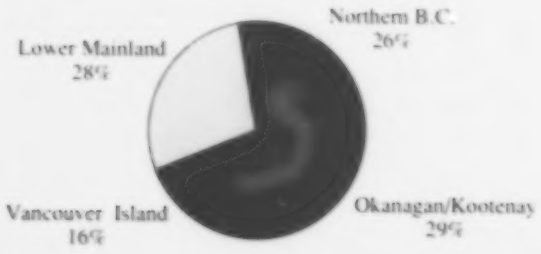
Related Occupations

Yarding Engineers, Bridge Crane Operators and Conveyor Operators.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	6,430	5,270	6,400

Annual Growth 1987-1995: 2.5%

Main Industries of Employment 1986 Census

Construction	45%
Mining	13%
Miscellaneous Transportation	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,130	770	1,900

8731 Electrical Power Line Installers and Repairers and Related Occupations

Nature of the Work

This classification includes occupations concerned with constructing and maintaining power lines that carry electrical transmissions over long distances as well locally. Line workers, service line workers, and repair line workers are included in this category.

Line workers are employed in several settings. They erect high-voltage transmission lines leading from electricity generating sites to places where the electricity is used. They assist in constructing support towers, install insulators and other equipment, and string transmission lines. Power line workers move from project to project, often changing provinces and working in remote areas. Owing to the contractual nature of transmission line construction and the fact that it is usually only a part of a major project involving a generating facility, construction line workers may be unemployed between projects.

Repair and service line workers are on call at most times and may work for long periods during emergency conditions, such as major storms.

While most line workers are men, women are being encouraged to enter the trade and now represent a small but growing group. Line workers tend to leave the trade at an earlier age than in some other occupations. Most enter the occupation between the ages of 20 and 21, and start leaving it in their mid-30s.

Education and Skills

Apprenticeship programs are the usual means of entry into these trades. There is a Power Line Repairer Apprenticeship which lasts three and a half years. There is a three year Cable Installer-Repairer Apprenticeship Program as well. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11.

Power line workers must be physically fit and must have the agility and temperament to work at considerable heights in awkward positions.

B.C. Job Prospects

Employment in this trade has declined since 1981 following the completion of major electrical power system installations during the 1970's. At present, there are approximately 1,200 people in this occupation in B.C. and the number employed in 1995 is projected to be around 1,300. Employment opportunities include about 120 new job openings and 180 replacement opportunities over the next seven years. Employment growth will be about average but this could be exceeded if proposed new dam projects are started to supply electricity exports to the U.S.

Line workers work mainly during the summer months. Employment is nearly always full-time and remains stable, but is subject to changing economic conditions. The stability of the occupation is reflected in the 1987 unemployment rate for these workers that was well below the average for all occupations.

Earnings

Construction line worker's wages depend on the availability of work. Repair and maintenance line workers enjoy more regular although lower incomes. In 1987, union line workers were paid from just over $16.00 to over $20.00 per hour, depending on location. Since overtime is common, especially in busy times, actual average hourly rates of pay are frequently higher.

The 1986 Census data indicates that the 73% of line workers who worked full-time over the full-year in B.C. earned an average income of $39,700; the average overall for this occupation was $35,500.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,330	1,190	1,310

Annual Growth 1987-1995: 1.2%

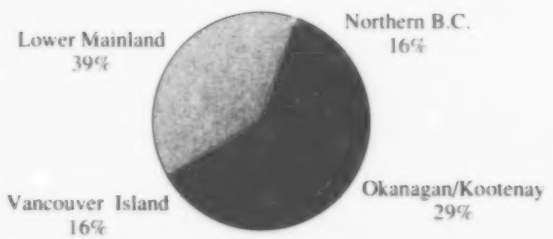
Main Industries of Employment 1986 Census

Electrical Utilities Industry	58%
Construction	13%
Telecommunications	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
120	180	300

Employment by Region



Construction Electricians and Repairers 8733

Nature of the Work

Electricians in this classification install and repair wiring in buildings and other structures and install switches, conduits, circuit breakers, lighting, programmable logic controllers and other apparatus. They work in both residential and non-residential construction, either as employees or as contractors. Electricians who are union members usually work out of a hiring hall, where work is allocated by the union.

Much electrical work is done in a standing position, often in confined spaces. Physical risks involved include falling from a height or receiving an electrical shock.

The majority of construction electricians are men, but women are encouraged to enter the trade and do represent a growing proportion of this work force.

Education and Skills

Most electricians enter the trade through an apprenticeship. An entry-level electrical technician program is available at several colleges and requires Grade 12 with a strong background in math, physics and English. Graduates can look for entry-level jobs in the trade or start the four year Electrical Work (Electrician) Apprenticeship, which includes eight weeks of in-school training each year. Those who have taken the entry-level trades program above receive Level 1 technical training credit. A three year Electric Metering Apprenticeship is also available.

Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11. A mechanical aptitude and an analytical approach to problem solving is essential.

B.C. Job Prospects

Employment is linked to overall economic conditions. During the recession of the early 1980s, the number of unemployed electricians claiming unemployment insurance rose dramatically. Between 1987 and 1995, employment is expected to grow at an above average rate. In new construction, as opposed to maintenance work, the demand for electricians should expand significantly.

Electricians are a large job group in the B.C. economy and by 1995 are projected to employ 6,160 workers. It is estimated that this occupation will require close to 1,810 additional employees between 1987 and 1995.

A recent trend that may increase the amount of work available to electricians is the growing popularity of "smart" buildings. These structures have a central computer that monitors and controls many functions such as heating, air conditioning, ventilation, and lighting. Electricians are called upon to install much of the necessary equipment and wiring.

Electricians generally work on a project-by-project basis, and when construction activity is slack, many are unemployed until the next project. In 1987, unemployment was above average suggesting that labour market conditions for this occupational group were less favourable than for most occupations. However, seasonal variation in employment is not nearly as pronounced as in most other construction trades.

While the majority of these workers are employed by the construction industry, electricians are also employed by other industries such as Mining (7%), Forest Products Manufacturing (9%), and Electrical Power Distribution (3%).

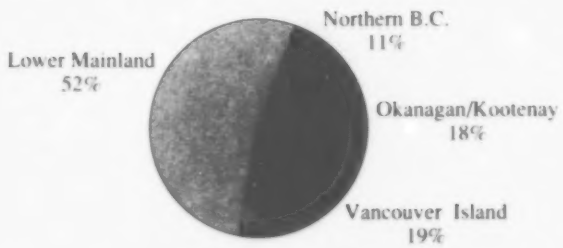
The rate of attrition in the electrical trade is somewhat greater than in other skilled construction trades and electricians often leave the trade at an earlier than average age. Many enter the trade between the ages of 19 and 23, and later in their careers may form their own contracting businesses.

Earnings

In 1987, unionized construction electricians in B.C. earned a hourly base rate of $20.35.

The 1986 Census indicates that the 39% of construction electricians who worked full-time over the full-year in B.C. earned on average an annual salary of $32,500.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	6,700	4,920	6,160

Annual Growth 1987-1995: 2.9%

Main Industries of Employment 1986 Census

Construction	62%
Forest Products Manufacturing	9%
Mining	7%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,240	570	1,810

8735 Wire Communications and Related Equipment Installing and Repairing Occupations

Nature of the Work

Occupations in this group cover the installation, repair and maintenance of all wire communication equipment. This includes installing telephone lines, maintaining special systems for the transmission of computerized data, and installing telephones, cable TV lines and burglar alarms in private residences and commercial buildings. Although there is a trend towards pre-wired buildings, much of the work consists of upgrading wiring in existing buildings. Other occupations in this classification are telephone technician, wire installer, burglar-alarm installer, cablevision installer and switchboard repairer.

The working conditions of this group vary greatly. Line installers work outdoors, often in inclement weather, installing poles and lines. Other workers install or repair equipment in commercial buildings and private houses.

Wiring technicians work regular hours, but they may be on call 24 hours a day for emergency repairs. Emergencies usually occur in poor weather conditions and can result in long hours.

While most members of this occupation are men, the number of women in this occupation has grown considerably.

Education and Skills

There are no compulsory apprenticeship programs, but most people entering this occupation have Grade 12 with mathematics, physics and chemistry, and have taken courses in electronics at the community college or vocational school level. Six to twelve month electronics technician programs are available at most colleges and BCIT.

A basic knowledge of hand tools is required. The splicing of many, very small, colour-coded wires requires that people in this occupation work systematically and with patience. Good eye sight, a good diagnostic ability and the ability to distinguish colours are also necessary.

In large companies, even after an electronics education, wiring technicians must take an internal apprenticeship program, since technical equipment is usually firm-specific. While this can reduce mobility between firms, because any new employee would have to be retrained regardless of experience, it also implies that most firms promote from within. A person starting at the bottom can therefore progress to positions such as foreman/forewoman or shift supervisor and occasionally to jobs beyond first-line supervisor.

B.C. Job Prospects

Employment in this occupation increased rapidly during the 1970s due to the growth of the electronic communications industry. Productivity growth, a maturing market and the recession resulted in job losses between 1981 and 1987.

Over the forecast period it is projected that this occupation will experience slower than average employment growth. Of the 760 job openings estimated to occur through to 1995 in this fairly large job group, approximately 430 will be replacement openings.

Employment as a wiring technician in the communications industry tends to be steady, with little seasonal or cyclical variation. The fact that the communication industry is the main employer of these workers (74%) lends overall stability to this occupation. Technicians who work for manufacturers of electrical products (3% of workers) or in the construction industry (10% of workers) often encounter seasonal and cyclical unemployment.

Technology is changing rapidly in this field, with the incorporation of fibre optics and improved computer technology. Consequently, technicians in this occupational group will require periodic retraining or skill upgrading.

Earnings

The 1986 Census indicates that the 85% of employees in this occupation who worked full-time over the full-year in B.C. earned an average annual salary of $33,900.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,430	4,910	5,240

Annual Growth 1987-1995: .9%

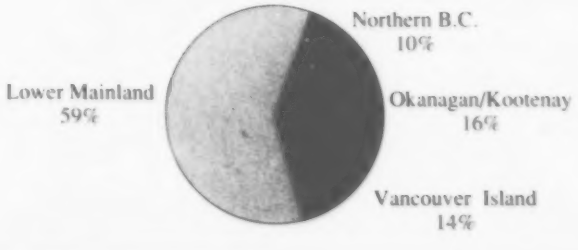
Main Industries of Employment 1986 Census

Telecommunications	74%
Construction	10%
Electrical Products Manufacturing	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
330	430	760

Employment by Region



Inspecting and Testing Occupations: Electrical Power, Lighting and Wire Communications Equipment

8736

Nature of the Work

Occupations in this group include cable tester, electrical inspector, relay tester and testboard analyzer. They are concerned with quality in the installation and repair of wiring and equipment for electric power generation and transmission. Patrollers inspect overhead wires for signs of damage or weakness, often from the pole or by using an infrared scope, which detects hot spots.

Other inspectors: test and inspect electrical cables in buildings to determine whether they can carry the required electrical load; read wiring diagrams to ensure that buildings meet the electrical code requirements; and examine fire-damaged buildings for faulty wiring. They also assist owners, contractors and electricians in planning electrical installations. People in this occupational group also test transmission facilities (overhead wires, transformers and switching systems), trace and diagnose wiring and circuit deficiencies and test and maintain office telecommunications equipment.

Inspectors may work outdoors, often in poor weather conditions and for long hours during emergencies. In generating stations or in telecommunications offices, their jobs often require shift work, because some equipment must be monitored 24 hours a day.

Education and Skills

People usually enter these occupations as a result of a promotion, after several years experience in a repair and installation position. There are no provincial apprenticeship programs for this occupation. However, employees in this group have already completed the courses required for the relevant entry-level occupations including electrical power line installers, construction electricians and communications installers (See SOC 8731, 8733, & 8735). Most large firms provide in-house training. Inspectors should be graduates of a high school technical program, although many employers want college graduates. Most colleges offer electrical and electronics technician programs.

Since technology is changing quickly in this field, and many systems are being computerized, employees can expect to undergo continuous retraining as new equipment is developed. However, the training a person receives in one firm may not be transferable to other firms because of the specialized nature of the equipment each firm uses. This may partially explain why there is very little movement into or out of this occupation.

B.C. Job Prospects

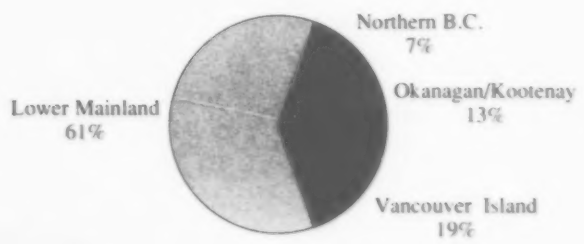
This is a small occupational group in B.C. and the employment level decreased significantly during the 1970s and between 1981 and 1987. Continued below average growth to 1995 is expected. Of the just over 100 new openings expected to 1995, approximately 80 will be replacement vacancies rather than job growth. Unemployment in 1987 was above average suggesting that current labour market conditions are less favourable than for most occupations. Improvements in technology are one reason for slower employment growth. The new systems in use are self-diagnostic, need less maintenance and require fewer inspectors. Employment is concentrated in the telecommunications and the electric utilities industries, which each account for about one third of all inspectors. Others work in the manufacturing of electrical products (4%), construction (9%) and in government (7%). Employment is not seasonal or cyclical and there is little part-time work.

Earnings

Wage rates vary greatly, depending on the nature of the equipment being serviced and the company. As an example, the 1987 agreement between the Communications, Electronic, Electrical, Technical and Salaried Workers of Canada and Bell Canada reveals wage rates ranging from $9.48 to $18.65 per hour for repair technicians and testers.

The 1986 Census indicates that the 87% of employees who worked full-time over the whole year in B.C. had an average employment income of $37,000.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	460	270	290

Annual Growth 1987-1995: 1.1%

Main Industries of Employment 1986 Census

Telecommunications	33%
Electrical Utilities	33%
Construction	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
20	80	100

Nature of the Work

Carpentry occupations include carpenters, joiners, framers, form builders, maintenance carpenters and others involved in the construction, renovation and maintenance of wooden structures. They are among the most numerous of skilled construction tradespeople, since all types of construction provide employment for them. Carpenters have traditionally worked on wood, but in modern construction they also work with plastics, metal and other materials. Rough carpentry involves construction formwork, framing of buildings and other work associated with the assembly of basic structures. Finishing carpentry, is concerned with the final stages of construction, such as the installation of doors, mouldings, stairs and so forth.

Carpenters can either work as employees or independent contractors and usually work on a project-by-project basis. When construction activity is slow, unemployment among carpenters may be high. Members of a construction union usually work out of a union hiring hall with work allocated to members on a rotating basis. A typical work week is 35-40 hours, however, overtime is common in order to complete projects within allocated time frames.

Womens' participation is increasing and the number of women in the carpentry trade more than tripled between 1971 and 1986.

Education and Skills

Qualified carpenters normally complete a four year apprenticeship. Most colleges offer entry-level training programs which require a minimum of Grade 10. Graduates may look for entry-level jobs in the trade or start the four year Carpentry Apprenticeship, which includes six weeks of in-school technical training each year. Those who have taken the entry-level trades program receive Level 1 technical training credit.

Individuals who do not complete the formal apprenticeship must have five years of suitable experience to be eligible to write the B.C. Trades Qualification (TQ) Certification exam. Obtaining a TQ is important because without it there is limited job availability and no career progression. A two year Metal Cladding Apprenticeship is also available.

Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Selkirk College offers a nine month Fine Woodworking Program. The main training objective of this program is self-employment, with students developing flexible and readily portable skills.

Carpenters should be physically fit and possess good hand-eye coordination.

B.C. Job Prospects

Employment declined during the early 1980's as a result of the recession and by 1987 was still well below the 1981 level. After strong employment gains in 1988, growth is expected to taper off through 1995 reflecting a moderate increase in industrial and commercial construction with a slight decline in residential projects. This is a very large occupational group. Total job opportunities are projected at close to 6,000 from 1987 to 1995, including job growth and openings due to attrition.

Increasingly, carpenters are being called upon to install pre-manufactured assemblies resulting in fewer workers being required on-site. They are subject to periods of unemployment during times of economic recession. Seasonality also affects their employment. The unemployment rate for carpenters in B.C. is currently above average and this reflects the fairly large number of workers who have not completed their TQ.

Earnings

The Canadian Construction Association reported that the basic hourly union wage rate for carpenters in B.C. during 1987 was $19.10.

According to the 1986 Census the 22% of carpenters who worked full-time, full-year earned an average income of $24,800 with the overall average being $15,300.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	20,560	13,410	17,250

Annual Growth 1987-1995: 3.2%

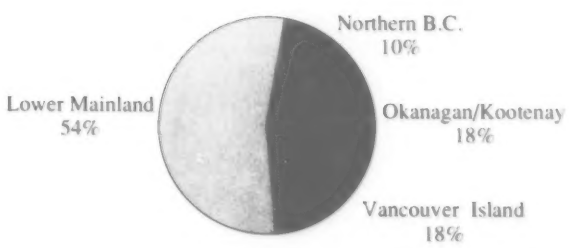
Main Industries of Employment 1986 Census

Construction 75%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
3,830	2,140	5,970

Employment by Region



Bricklayers/Masons and Tile Setters 8782

Nature of the Work

This occupational group includes trades concerned with preparing and laying brick, block, stone, tile, refractory brick and similar materials. Masons read and interpret plans, conduct measurements and lay out their work. They work in commercial and institutional building construction and on residential structures where brick and stone are used.

Masons work in a variety of settings involving new or renovation construction. They are often employed on a project-by-project basis, either as employees or as independent contractors. Masons who are members of construction union locals usually work out of a union hiring hall where work is allotted to them by the union.

Most masons are men, although more women have been entering the trade in recent years.

Education and Skills

Entry into these trades is usually through an apprenticeship. BCIT and Kwantlen College offer an entry-level Bricklaying/Masonry Program which requires Grade 10. Graduates may look for entry-level work in the trade or start the four year Bricklaying Apprenticeship which includes 21 weeks of in-school technical training. Those who have taken the entry-level trades program receive Level 1 technical training credit. Those without the formal apprenticeship must have five years of suitable experience to be eligible to write the B.C. Trades Qualification (TQ) Certification exam.

The Tilesetting Apprenticeship term is three years with four weeks of in-school training each year. TQ certification is not offered in this trade. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12, and a math 11 and science 11.

Skills needed are the ability to make accurate calculations regarding dimensions and distances, good spatial perception for interpretation of drawings and specifications, and good hand-eye coordination. Good physical condition is also necessary because workers often lift heavy loads or work in a stooping or kneeling position.

B.C. Job Prospects

Masons who work on construction projects may experience frequent periods of unemployment as they wait for new work following completion of a project or the end of winter. This pattern of unemployment is more pronounced during economic slowdowns. During the recession of the 1980s unemployment rose dramatically, peaking in 1984.

Because of the large number of masons in the older age group, a significant portion of the masonry work force will be retiring over the next decade. This will create many employment opportunities for those entering the trade during the 1987 to 1995 period.

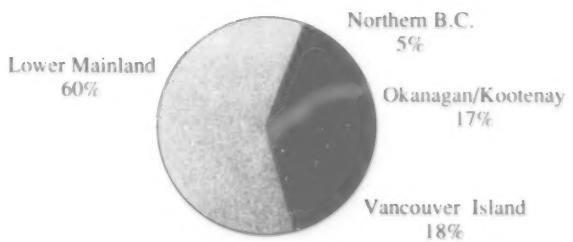
Like other construction trades, employment for masons and tile setters declined significantly during the early 1980s due to the effect of the recession. However, strong replacement needs, plus above average growth, will create approximately 710 employment opportunities through to 1995. By then, employment should be close to the pre-recession levels of employment in this fairly large job group.

Earnings

Wages in this occupational group vary according to the kind of work, residential or non-residential, union or non-union, and range from $10.00 to over $20.00 per hour. The extent of fringe benefits also depends on the work setting. The hourly base rate for unionized bricklayers in B.C. during 1987 was $19.19.

According to the 1986 Census, the average annual employment income for the 22% of workers employed full-time, full-year was $22,340; the average for all workers in this group was $15,800. The difference in annual salaries is caused by prolonged periods of unemployment for a large portion of workers, which is typical for this occupational group.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,270	1,610	2,120

Annual Growth 1987-1995: 3.5%

Main Industries of Employment 1986 Census

Construction 88%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
510	200	710

8783 Concrete Finishing and Related Occupations

Nature of the Work

This group includes cement masons, cement-gun nozzle operators, concrete smoothers and terrazzo workers. Concrete workers are employed on construction sites ranging from sidewalks, boulevards and foundations for houses to large construction projects, such as high-rise buildings. They usually work outdoors, although on some occasions the work is inside.

Cement masons prepare forms into which concrete is dumped by truck, wheelbarrow or crane, depending on the size of the form. After ensuring the concrete is the right depth and no air pockets are left, masons smooth the surface using a large board with a handle. Cement masons may also spray concrete onto sub-structures for later finishing, using hand or power tools.

Terrazzo workers apply marble or stone chips to floors, walls or other fixtures to obtain a durable and decorative surface. They first prepare the surface with flooring paper followed by a mortar mixture. They then develop a pattern using metal strips, and embed the terrazzo tiles according to the pattern. Sometimes the tiles are pre-finished, but usually they need grinding and polishing to provide a flat, smooth surface.

Education and Skills

There are few formal preparatory courses for this occupation. On-the-job training and experience are the main ways of learning the trade, so many people look for entry-level work directly out of high school. The recommended route is through the three year Cement Masonry Apprenticeship. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

B.C. Job Prospects

Employment growth in this occupation should be higher than the average for all occupations. Also, the age structure indicates a large number of workers between 40-60 years of age, which will mean additional job openings through attrition over the next two decades.

After strong growth during the 1970s this occupation suffered a large number of layoffs during the recession in the early 1980s. Recently, there has been a trend towards greater use of concrete in commercial construction, which has improved the employment situation. Also helpful is the current outlook for the construction industry which is also slightly better than the average for all industries.

Work in this occupation is seasonal and very susceptible to changes in business conditions, owing to the boom-and-bust nature of the construction industry, which employs eight out of ten concrete finishers. Anyone entering this occupation should expect a work pattern of a busy period requiring overtime, followed by layoffs and extended periods of unemployment.

Earnings

The basic union hourly wage rate for cement masons in B.C. during 1987 was $18.25.

According to the 1986 Census, the average annual employment income for the 19% of workers who were employed full-time, full-year, was $29,600. The average for all workers in this occupational group was $18,000, which indicates that a large portion are affected by seasonal employment patterns.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	930	650	850

Annual Growth 1987-1995: 3.3%

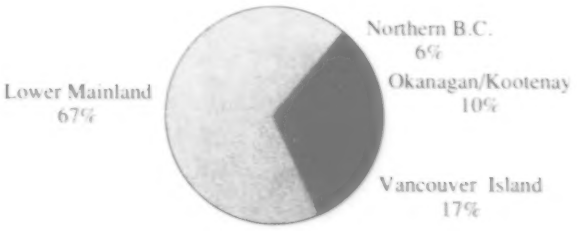
Main Industries of Employment 1986 Census

Construction 83%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
190	100	290

Employment by Region



Plasterers and Related Occupations 8784

Nature of the Work

This occupational group includes plasterers, lathers, drywall installers and tapers. Plasterers apply plaster, stucco and other materials to building surfaces. The materials are usually in the form of a slurry, which is applied and then given the appropriate texture. Lathers fasten metal, wood or gypsum lath to structural surfaces to provide a base for plaster or other materials. Sometimes they build frames to which they attach the lath.

Drywall installers trim and attach drywall, a material composed of a sheet of plaster glued between two sheets of heavy paper. After drywall is applied, it must be finished by applying tape or other material over corners and the joints between sheets. This is the function of a drywall taper or finisher.

Plasterers and the others in this group work in a variety of construction settings, residential and non-residential, union and non-union, as employees and as independent contractors. Except for the application of stucco plastering, all plastering is done indoors, frequently in dusty, poorly lit conditions.

Most workers enter the plastering trade between 18 and 20 years of age. While the number of women plasterers is small, the number has grown over recent years.

Education and Skills

College entry-level training is not available for these trades. There is a four year Wall and Ceiling Installer Apprenticeship which includes sixteen weeks of in-school technical training. The Drywall Finisher Apprenticeship term is three years, with eight weeks of technical training. Because of changes in construction methods, plastering is now a small apprenticeship in B.C. It has an apprenticeship term of four years. Apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

The work in these occupations is often physically demanding and requires good general health and stamina, and good vision.

B.C. Job Prospects

This is a small job group in B.C. and one that was greatly reduced in size by the recession during the early 1980s. While the employment level has improved, it is not expected to recover to the 1981 level in the near future. However, average growth is expected over the 1987 to 1995 period with the creation of approximately 650 new jobs. This growth is in line with the overall growth in construction industry activity. Additional positions will open to replace retirees but there are only an average number of plasterers and drywallers approaching retirement.

Drywall has almost replaced plaster as a finishing material, except for special decorative applications. This will result in more job opportunities for workers skilled in drywall installation and taping.

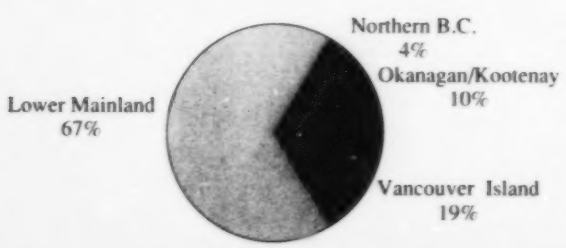
Plastering work is seasonal, but because most jobs are indoors, employment fluctuates less than in other construction trades. The concentration of these workers in the construction industry (95%) makes employment especially vulnerable to periodic recessions in construction activity. Most work is full-time, although the incidence of part-time work has increased in recent years. However, the portion of plasterers that work year-round and full-time is about half that of all occupations.

Earnings

The basic union hourly wage rates in B.C. for plasterers and drywallers respectively during 1987 were $20.25 and $19.38. A 1989 survey in the Vancouver area by Employment and Immigration Canada reports hourly wage rate ranges of $16.86 to $21.62 for union plasterers and $8.50 to $16.00 for non-union plasterers.

The 1986 Census for B.C. indicates that the average annual employment earnings for the 18% of those who worked full-time, year-round was $21,500.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,410	1,960	2,610

Annual Growth 1987-1995: 3.6%

Main Industries of Employment 1986 Census

Construction	95%
Various Manufacturing	2%
Miscellaneous Services	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
650	130	780

8785 Painters, Paperhangers and Related Occupations

Nature of the Work

Painters, paperhangers and decorators apply paint, wallpaper and fabrics to walls and ceilings. They work on most types of construction projects, as well as in maintenance.

Painters first prepare surfaces by removing old paint or wallpaper and repairing old plaster and defective woodwork. After organizing their equipment, they brush, roll or spray on the paint.

Painters must often stand, bend and crouch for long periods and work at heights. They also have to move heavy ladders, scaffolding and paint containers.

Employment is usually on a project-to-project basis. Painters often work as self-employed contractors or as members of a construction union, in which case they receive work from a union hiring hall. They also may be employed on a permanent basis for maintenance work.

Education and Skills

The provincial Apprenticeship in Painting and Decorating lasts three years with four weeks of in-school technical training each year. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Workers should have physical stamina, manual dexterity and a good sense of colour.

B.C. Job Prospects

Painters constitute a fairly large job group in B.C. with close to 4,300 engaged in this occupation in 1987. Employment among painters in B.C. fell during the recession of the early 1980s, but regained the 1981 level by 1987. Employment should continue to grow until 1995 with the creation of an estimated 1,310 new job openings during this period. Replacement openings resulting from attrition should provide a further 770 job opportunities for people wishing to enter the trade.

The painting trade is affected by variations in economic activity. It is particularly linked to construction activity given that 83% of the painters in B.C. are employed in this industry. Employment for painters who work on new structures fluctuates considerably. This fluctuation in employment levels is reflected in a somewhat above average level of unemployment. While the re-painting of existing structures provides a less volatile base of employment for painters, this is a very small component of the overall occupation.

The use of new, long-lasting paints and more efficient methods of paint application reduces the need for painters. Seasonal factors also affect employment with less outside work being done during the winter months. While some part-time painting jobs exist, the number is below the average for all occupations. However, the proportion of painters that work year-round and full-time is about half that of all occupations.

The painting trade is dominated by men, but the increase in the number of women entering the occupation since 1981 means that women now constitute 8% of this occupational group. This trend is expected to continue.

Earnings

According to the 1986 Census, the average employment income for all painters in B.C. was $12,300. This low level of income reflects the fact that a very small portion of painters worked full-time over the whole year.

A 1989 survey in the Vancouver area reports hourly wage rate ranges of $10.13 to $20.45 for union painters and $8.00 to $16.00 for non-union painters.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,140	4,300	5,610

Annual Growth 1987-1995: 3.4%

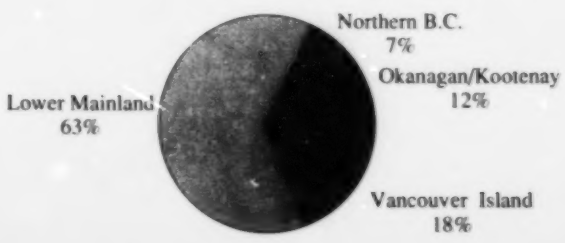
Main Industries of Employment 1986 Census

Construction	83%
Various Manufacturing	4%
Educational Services	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,310	770	2,080

Employment by Region



Nature of the Work

This occupational group includes insulation blowers, construction insulators, pipe coverers and air-conditioning equipment insulators.

In houses, insulation work involves stuffing insulating bats between wall studs and covering walls with a plastic vapour barrier, or blowing loose insulation into the attic using a compressor. Sometimes insulators blow insulating material into the cavities of existing walls. Rigid foam insulation is either nailed or glued onto walls and then covered with a sheathing material. In commercial buildings, workers may use a hose to spray foam insulation onto a wire mesh.

Boilers, heating pipes and air conditioners also are insulated to prevent unwanted transfer of heat. An insulating blanket or sheath is cut to size and placed over the heat-radiating part. The insulation is then taped, sewn or wired securely into place.

Insulators work both indoors and outdoors on construction sites, and in existing buildings when the insulation is being upgraded. They must often work in cramped dusty areas, such as attics, or stand on scaffolding or ladders for long periods of time. Since there is some health risk in removing older types of insulation such as asbestos or urea formaldehyde foam insulation, insulators need to take proper safety precautions.

In 1981, over one-third of all insulators were under the age of 25 years and less than one-quarter were 40 years of age or over. Many people enter this occupation and then leave after only a few years. This suggests that this occupation is often used as a means of entering other occupations in the construction industry.

Education and Skills

The usual method of entering this occupation is through the four year Heat and Frost Installation Apprenticeship which includes four weeks of technical training each year. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Insulation workers must have a knowledge of hand tools and power tools. Although a great deal of strength is not required for this occupation, coordination and the ability to stand for long periods of time is important.

B.C. Job Prospects

Employment in this occupation grew at about twice the rate of overall employment during the 1970s, but fell during the recession of the early 1980s. The 1970s growth can be attributed to rising energy prices and government incentive programs, which encouraged refitting in older buildings and the upgrading of insulation standards for new buildings. Such incentive programs are not likely to be repeated and most older buildings have now been refitted, so it is unlikely that the 1970s boom will reoccur. However, employment growth in B.C. is projected to be above average.

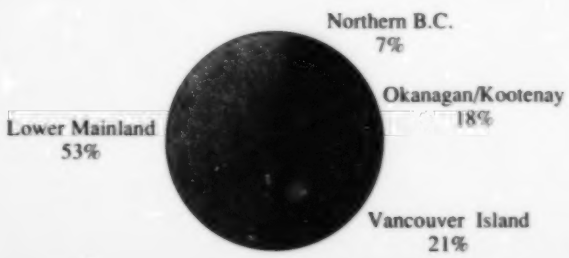
While the majority of insulators are employed by the construction industry (81%), they are also employed by various manufacturing industries such as pulp and paper (4%), rubber and plastic (3%) and primary metals (2%).

For this occupation, seasonal and business cycle swings that negatively affect the construction industry can lead to high levels of unemployment. This is reflected in the current higher than average level of unemployment and the fact that only 20% work full-time, full-year.

Earnings

The Canadian Construction Association reported that the basic union hourly wage rate for insulators in B.C. during 1987 was $18.31. However, it should be noted that many insulators work for small, non-union contracting companies and that the seasonal nature of insulating work affects annual incomes, which averaged $15,700 in 1986, according to the census.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	700	470	620

Annual Growth 1987-1995: 3.4%

Main Industries of Employment 1986 Census

Construction	81%
Pulp & Paper Manufacturing	4%
Rubber & Plastic Manufacturing	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
140	40	180

8791 Pipefitting, Plumbing and Related Occupations

Nature of the Work

This occupational group includes workers in the various piping trades such as plumbers, pipefitters, steamfitters, gasfitters and sprinkler fitters. While all these concern piping systems, each has its own primary focus. Plumbers generally work in a residential or commercial setting. Pipefitters work on industrial applications. Steamfitters and gasfitters are specialists in the kind of installations on which they work. Sprinkler fitters install sprinkler systems in buildings as fire protection. Piping tradespeople must understand and follow detailed plans. They cut and shape pipes, install fittings and supports, and modify structures to accommodate their work. They are proficient in using a wide range of hand tools, powered machines, torches and welding apparatus. By acquiring peripheral skills, such as general welding or basic electricity, they can improve their employability.

Working conditions in the piping trades are often cramped and uncomfortable, and may require working at considerable heights. Many are members of a construction union and obtain their work at a union hiring hall.

Most workers in the piping trades are men, although in recent years women account for a growing number of the workers in the piping trades.

Education and Skills

BCIT and Camosun College offer six month entry-level Programs in Plumbing and Steamfitting. Graduates may look for entry-level work in the trade or start an apprenticeship. Apprenticeship terms in Plumbing, Steamfitting, Sprinklerfitting, and Pipefitting last four years and include 24-26 weeks of in-school technical training. Those with an entry-level program receive Level 1 technical training credit. B.C. Trades Qualification (TQ) Certification is mandatory in these trades, so those without formal apprenticeships must have five years of suitable experience to be eligible to write the applicable exams.

A closely related occupation is the refrigeration trade. The apprenticeship lasts four years and TQ certification is also mandatory in this trade.

There are two Gasfitter apprenticeship programs. The largest demand for gasfitters exists in residential and commercial construction. Apprenticeships for Domestic/Commercial Gasfitters last two years with eight weeks of technical training. Gasfitters completing this program will be eligible for a Certificate of Apprenticeship and a "B" Gasfitter's License. There will, however, continue to be limited demand for those trained to the "A" level. The Industrial Gasfitters Apprenticeship lasts two years, with eight weeks of technical training. Entrance requirements include appropriate on-the-job experience and a "B" Gasfitter's License. TQ qualification is not available in the gasfitter trades.

Apprenticeship employers in the piping trades prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11.

B.C. Job Prospects

Employment in the B.C. piping trades is expected to grow at an above average rate over the period to 1995 with the creation of 1,240 new jobs. This employment growth reflects an increase in demand in construction activities. While the majority of these tradespeople work in construction (57%), they are also employed by sectors of the economy such as pulp and paper manufacturing (8%), trade (3%), and government (5%).

Like most construction occupations, employment in the piping trades is subject to seasonal variation. However, since most piping work is indoors or under cover, seasonality is not as pronounced as some.

Earnings

A 1989 survey in the Vancouver area by Employment and Immigration Canada reports hourly wage rate ranges of $16.42 to $20.89 for union plumbers and $11.00 to $18.00 for non-union plumbers.

The 1986 Census indicates that the 42% of these tradespeople who worked full-time over the full year in B.C. earned an annual salary of $29,600.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	5,740	5,000	6,240

Annual Growth 1987-1995: 2.8%

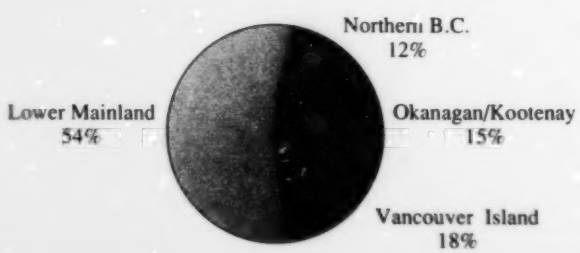
Main Industries of Employment 1986 Census

Construction	57%
Pulp & Paper Manufacturing	8%
Other Manufacturing	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
1,240	620	1,860

Employment by Region



Nature of the Work

Workers in this occupation erect and fabricate structural steel assemblies, such as the steel frames of buildings, bridges and tanks, and also shape and assemble reinforcing rods used in the preparation of reinforced concrete. In erecting steel assemblies, they work according to detailed plans. The work is generally broken into stages with separate teams, or gangs, performing each function. As a job progresses, any one gang member may perform all phases of the work on a rotating basis. Structural ironworkers perform many of their duties at heights, where there is considerable danger of falling or of being hurt by falling objects. They are often exposed to adverse weather.

Reinforcing ironworkers construct steel latticework using reinforcing rods around which concrete is poured. The work can be heavy and dangerous.

Ironworkers work on a project-by-project basis. They frequently travel long distances from job to job. Many are members of a construction union and often obtain work from a union hiring hall on a seniority or rotating basis.

Most ironworkers enter the occupation between the ages of 17 and 20. Women, who represent only a small proportion of the trade, are encouraged to enter the occupation through apprenticeship.

Education and Skills

BCIT offers an entry-level trades training program in Ironworking. It lasts six months and requires Grade 10, with Grade 12 preferred. Graduates may look for entry-level work in the trade or start the three year Ironworker Apprenticeship. Completion of the entry-level program is compulsory for the apprenticeship. A further eight weeks of in-school, technical training is provided during the apprenticeship. Those without the formal apprenticeship must have four years of suitable experience before becoming eligible to write the B.C. Trades Qualification (TQ) Certification exam.

Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Prospective ironworkers should be very agile, in excellent physical condition and they should have a good sense of balance. They must not have a fear of heights and must observe safe working conditions.

B.C. Job Prospects

This is a small job group in B.C. with less than 1,000 workers. Employment among ironworkers in B.C. decreased as a result of the economic slowdown of the early 1980s. Employment has increased but is still below pre-recession levels and is not expected to reach pre-recession levels before 1995. However, above average growth is expected over the 1987 to 1995 period with the projected creation of approximately 250 new job openings during this period. This, combined with an anticipated 70 openings created through workers retiring from the trade will provide 320 jobs for prospective ironworkers.

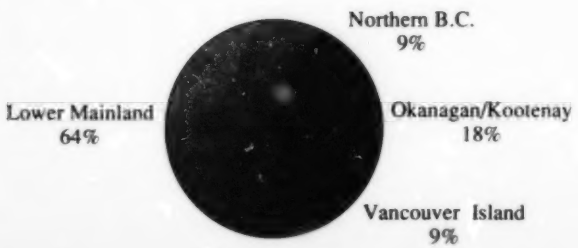
Given that 61% of ironworkers are employed by the construction industry, this occupation is susceptible to economic conditions affecting construction and construction investment. Ironworkers also work in metal fabricating (15%) and for the transportation industry (6%). When work is scarce, ironworkers, like other construction tradespeople, may be unemployed while waiting for their next job. Work is less plentiful during the winter months in some areas of B.C. This potential instability of employment is reflected in unemployment levels for this occupation in 1987 that were much higher than the average for all occupations.

Earnings

The basic union hourly wage rate for ironworkers in B.C. during 1987 was $18.98.

The 1986 Census data indicates that the average annual employment income for the 21% of B.C. ironworkers who worked full-time over the full year was $30,600. The average income for all in this occupation was $20,800.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,270	810	1,060

Annual Growth 1987-1995: 3.4%

Main Industries of Employment 1986 Census

Construction	61%
Metal Fabrication	15%
Tranportation	6%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
250	70	320

Nature of the Work

Glaziers cut and install glass for use in furniture, fixtures and buildings, including decorative stained glass windows and fixtures.

The work can vary significantly. Structural glass installers work on the outside of large office buildings on a scaffold or movable platform. The glass is raised by a crane and the glaziers guide and position it by hand. Factory glaziers cut and install glass in wooden or metal frames for such products as prefabricated windows, patio doors, shower stalls and glass display cases. Custom work, ranging from replacing the glass in an odd-sized window or store front to creating stained glass patterns, may also be carried out either in a factory or in a retail location.

Education and Skills

There is a Glazier Apprenticeship Program, which lasts four years and includes twelve weeks of in-school technical training. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and both a math and science 11.

Glaziers must be able to use many types of tool in their trade, including glass cutters, putty knives, power drills and grinders. In addition, factories are beginning to add automated machinery to produce air-tight, double and triple paned windows. Glaziers who work on commercial buildings must be prepared to work at great heights, often in poor weather, and must be strong enough to manoeuvre heavy sheets of glass into place. Glaziers working with stained glass need artistic skills.

B.C. Job Prospects

Job growth in this occupation was below average between 1981 and 1987 and projections to 1995 call for jobs to grow at about the average rate for all occupations. This is a small occupational group in B.C. with the number employed in 1995 expected to be about 780. This includes an estimated 160 new job openings and 40 replacement openings expected over the next seven years. Unemployment in 1987 was above average and suggests that the employment prospects for this occupation in B.C. are less favourable than for the majority of occupations.

This occupation is made up primarily of males, although there has been increased female participation over the last few years. The age structure is slightly tilted towards young and prime-age people, with most people starting work between the ages of 16 and 22 and usually remaining in the trade until retirement age. The work is mostly full-time.

Since many glaziers are employed by the construction industry (43%), which is very sensitive to changes in economic conditions, these workers can expect periods of unemployment during economic downturns. They can also expect some seasonal unemployment as building slows down in the winter months. Glaziers are also employed by the retail and wholesale trade (39%), metal fabricating (8%), wood products manufacturing (5%) and glass and glass products manufacturing (5%).

Over the last few years most of the windows and glass doors in residential construction have been prefabricated by glaziers in factories. These are then installed in houses by carpenters.

Earnings

The basic union hourly wage rate for glaziers in B.C. during 1987 was $19.68. A 1989 survey in the Vancouver area by Employment and Immigration Canada reports hourly wage rate ranges of $15.27 to $21.67 for union glaziers and $8.00 to $15.00 for non-union glaziers.

The 1986 Census indicates that the 47% of glaziers who worked full-time over the full-year in B.C. earned on average an annual salary of $24,500.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	740	620	780

Annual Growth 1987-1995: 3.0%

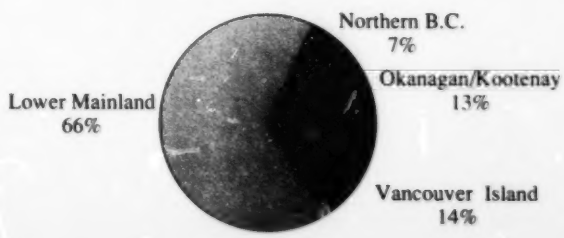
Main Industries of Employment 1986 Census

Construction	43%
Retail & Wholesale Trade	39%
Metal Fabrication	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
160	40	200

Employment by Region



91

Transport Equipment Operating Occupations

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▶ Air Pilots, Navigators and Flight Engineers 9111

Nature of the Work

This group includes pilots-in-command, navigators, flight engineers and helicopter pilots. Most pilots transport passengers, cargo and mail, while others dust crops, spread seed for reforestation, test aircraft and take photographs. In addition to transporting passengers, helicopter pilots are involved in fire-fighting, police work, offshore exploration, rescue efforts, logging operations and construction work. Flight engineers operate and monitor the various electronic and mechanical systems on large aircraft.

Education and Skills

The minimum level of education required to become a commercial air pilot is a two year community college program in aviation technology. In addition, the candidate must obtain a valid commercial pilot's licence and a radiotelephone operator's certificate before being licensed by Transport Canada as a pilot. Pilots normally start their careers by working with small, northern airline companies as air transport support workers until they build up flying hours.

The two year Aviation Technology/Training diploma program at Selkirk College is designed to train students for entry-level positions with major Canadian airlines. Admission requirements include high school graduation, including Physics 11 and Algebra 12. Prior to the start of the program, applicants must hold a Private Pilot License and must pass a medical examination. Vision should be 20/20 uncorrected and the minimum height is normally five feet seven inches.

The two year Aviation Technology/Training Diploma Program at Fraser Valley College provides the essential formal background necessary to qualify for professional positions whether in industry or Transport Canada which regulates aviation. The first year of the program qualifies students as Commercial Pilots, and the second involves a greater degree of specialization in such areas as airline, flight instructor, or wilderness flying. Grade 12 is required, with Algebra 12 preferred. In addition, applicants must hold a Canadian Private Pilot Licence.

B.C. Job Prospects

The majority of licensed commercial air pilots work in Quebec, Ontario and B.C., with the pilot-to-population ratio significantly higher in B.C. than in the other provinces or territories. Compared to all other occupations, growth in these jobs was slower than the average between 1981 and 1987, and expected growth to 1995 calls for a continuation of below average growth. This is a medium size job group in B.C., with the number of jobs in 1995 expected to be about 1,750. This includes an estimated 110 new job openings and 130 replacement opportunities expected over the projection period.

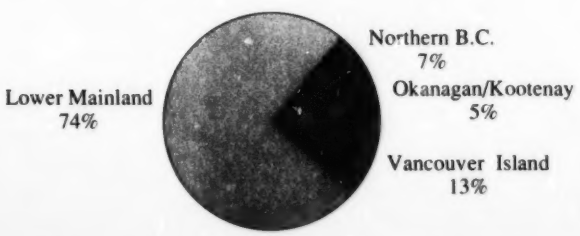
Employment in these jobs is vulnerable to changing general economic conditions and changes in transportation and policy regulations. For example, if the recent deregulation of the Canadian airline industry produces the labour market pattern of the deregulated U.S. industry, there will be initial job growth, followed by employee furloughs and wage cuts as increased competition causes airline mergers.

In 1987 unemployment was about average, suggesting that competition for job vacancies may be quite stiff. The main industry employing pilots in B.C. is the air transport industry; however, a small percentage are employed in forestry and the federal government. While technological changes have either been neutral or have favoured employment of pilots, many aircraft are now designed to fly without a flight engineer. In 1986 women made up only 2% of this occupation in B.C. Most pilots work full-time.

Earnings

The average annual B.C. employment income of this job group was approximately $52,100 in 1986. Sixty-seven percent were employed full-time, full-year, and these workers' income averaged $61,600.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,130	1,640	1,750

Annual Growth 1987-1995: .8%

Main Industries of Employment 1986 Census

Air Transportation	87%
Forestry	3%
Federal & Provincial Government	2%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
110	130	240

9113 Air Transport Operating Support Occupations

Nature of the Work

This classification includes air traffic controllers, flight service specialists, flight dispatchers, crew schedulers and airline radio operators. The job of an air traffic controller is to ensure that a safe distance is maintained around aircraft through designated airspace and that flights are as expeditious as possible. Flight service specialists provide essential flight information to pilots both before and during the flight, and provide emergency services, such as search and rescue of missing aircraft. An airline flight dispatcher authorizes, regulates and controls commercial airline flights over assigned routes according to governmental and company regulations.

These workers rotate day, night and weekend shifts, and often work overtime hours. During busy times, controllers must work rapidly and with total concentration to keep track of several planes at the same time.

Education and Skills

Air traffic controllers and flight service specialists are employed by Transport Canada. Qualifications include: high school graduation or the equivalent; excellent health with normal colour vision and visual correction of no more than 20/30; excellent hearing and diction; willingness to work shifts and/or alone and to relocate; and passing a security check. After applying to Transport Canada's Regional Staffing Office in Vancouver, candidates must pass written aptitude tests and personal interviews. Once accepted, an extensive, demanding, eight month training course in Ontario must be completed in addition to on-the-job training and a final evaluation. Candidates should have good comprehension and communication skills, the ability to perform under stress, quick and accurate decision-making and a good memory.

Flight dispatchers must be at least 18 years old with high school graduation or the equivalent. They receive airline company sponsored training in meteorology, navigation, aircraft performance and air regulations. Applicants with college courses in these subject areas are at an advantage.

B.C. Job Prospects

Job growth in this occupational group was below average from 1981 to 1987 and projections to 1995 call for jobs to continue to grow more slowly than the average for all other occupations. Although the highest number of flight dispatchers and air traffic controllers relative to population are in B.C. and Newfoundland, this is a small job group in B.C. The number of jobs in 1995 is expected to be about 840. This includes an estimated 50 new jobs and 80 replacement opportunities expected over the projection period.

Employment in air transport support occupations is vulnerable to changing general economic conditions and changes in transportation and policy regulations. For example, if the recent deregulation of the Canadian airline industry produces the labour market pattern of the deregulated U.S. airlines, there will be initial job growth, followed by employee furloughs and wage cuts as increased competition causes airline mergers. Despite the relatively slow employment growth rates observed in recent years, unemployment is lower than in the general labour market, and there is currently a shortage of air traffic controllers in B.C.

The main industries of employment for these workers are the air transport industry and the federal government (Transport Canada). There is little seasonal variation in employment and little part-time work, compared with other occupations. More women have chosen these occupations over the last several years, with their representation increasing from 7% to 13% from 1971 to 1986.

Earnings

The average annual employment income of this job group was approximately $30,600 in 1986 in B.C. Seventy-four percent were employed full-time, full-year, and these workers' income averaged $36,000.

Annual salaries for air traffic controllers with Transport Canada range from $16,900 (trainees) to $68,900 (senior controllers in management positions).

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	950	790	840

Annual Growth 1987-1995: .8%

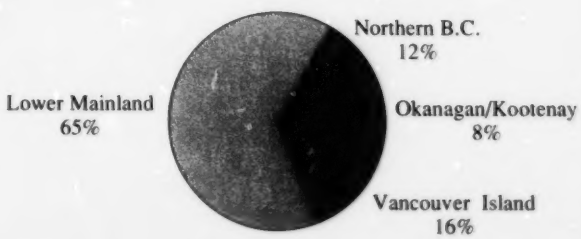
Main Industries of Employment 1986 Census

Air Transportation	84%
Federal Government	13%
Forestry	1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
50	80	130

Employment by Region



▶ Deck Officers 9151

Nature of the Work

Deck officers include ship masters, mates, pilots, navigators and other officers, who transport passengers and cargo on oceans and inland waters, set the ship's course, use navigational aids, supervise operations, inspect cargo movement and manage the deck crew. They work variable and long hours and may travel for extended periods. The work area on board ships is typically in constrained surroundings.

The increased entry of women into this occupation as reported by the census indicates that women made up 2% of this occupation in B.C., up from virtually none in 1971.

Education and Skills

Grade 12 is the minimum education required. However, those considering a career at sea should realize that the technological equipment of modern vessels requires an advanced level of training to perform the duties and responsibilities of officers.

The first step is to gain experience as a deckhand (see profile SOC 9155, Deck Crew, Ship). Two years of time at sea are required to be eligible to write Transport Canada's exam for a Watchkeeping Mate Certificate, the lowest level of deck officer certification. Other certificates in the series of federally legislated certifications include Coastal Navigator, Ocean Navigator and Master Mariner. The top level of Master Mariner can be attained in about ten years. Pacific Marine Training Institute, Northwest and Camosun Colleges offer nautical training programs for those who wish to prepare for these certification exams.

Certification regulations require that applicants must be Canadian citizens or have status as a permanent resident of Canada; be at least 18 years old; have successfully completed, within the previous five years, a Marine Emergency Duty Level II course; and hold a first aid certificate.

This occupation requires people with good communication skills who are interested in working with details, processes, machines and techniques and enjoy achieving cooperative and successful working relationships.

B.C. Job Prospects

Employment remained relatively stable over the past ten years and growth over the next seven years is expected to be average for all occupations. This is a medium size occupational group in B.C. with the number employed in 1995 expected to be about 2,040. This includes an estimated 180 new job openings and 330 replacement openings expected over the next seven years.

Unemployment in 1987 was below average and suggests that the demand for qualified people is better than the average for all occupations.

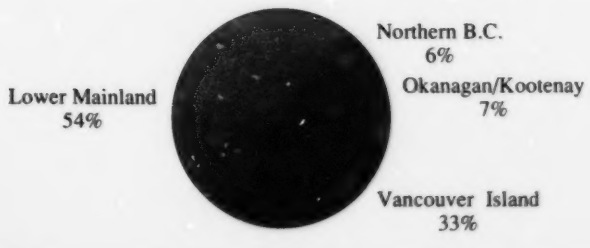
Changes in the economy that affect the forest industry and port activity have a direct effect on the demand for deck officers in the provincial towing industry. Seasonal variation with peaks during the summer and fall is also characteristic of all B.C. marine employment.

The federal fleet (Fisheries and Oceans, Public Works, Defense Auxiliary and Coast Guard), the provincial ferry system, towing companies and the forest industry are the main employers of deck officers in B.C.

Earnings

Pay ranges in this occupational group vary according to the type and size of ship, nature and responsibility of the position, and length of time at sea. The 1986 Census indicates that deck officers who worked full-time over the full-year in B.C. earned on average an annual salary of $44,900.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,350	1,860	2,040

Annual Growth 1987-1995: 1.2%

Main Industries of Employment 1986 Census

Water Transportation	74%
Government	12%
Forestry	4%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
180	330	510

Nature of the Work

This occupational group includes engineering assistants or mechanics as well as marine-engineer officers. The latter operate, install and repair the main ship engines, supervise and coordinate the activities of the engine room crew and inspect the engines and other mechanical and electrical equipment. The work environment is indoors in an isolated setting and involves exposure to noise, odours and other hazards requiring the use of safety equipment and clothing.

Education and Skills

There are two routes to gaining the needed experience to become an engineering officer. One of these is to work as an oiler and acquire 36 months of time at sea. Another route is to complete an entry-level trades program in Diesel Mechanic or Heavy Duty Equipment Mechanic and start work on a vessel as an Apprentice Engineer. This apprenticeship lasts three years. Both these options qualify people to write Transport Canada's compulsory Fourth Class Marine Engineer exam. Those who have completed the apprenticeship get advanced standing for the Third Class Certificate. The highest engineering qualification required in the engine room of the largest vessels is the First Class Marine Engineer and this can be attained in about ten years. Those interested in a sea going career should contact the Pacific Marine Training Institute in North Vancouver.

With the use of electronics and computers and requirements to conserve fuel due to increased costs, the duties of engine room personnel continue to become more complex. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12, Algebra 11 and Physics 11.

B.C. Job Prospects

Job growth in this occupation was well below average between 1981-1987 and projections to 1995 call for jobs to grow at somewhat less than the average rate for all other occupations. This is a small occupational group in B.C. with the number employed in 1995 expected to be about 840. This includes an estimated 80 new job openings and 240 replacement openings expected over the next seven years. This high number of replacement openings relative to the size of the occupation reflects that the number of people leaving this occupation through to 1995 is well above average.

Unemployment in 1987 was below average which suggests that employment opportunities were more favourable in this occupation than for the average of all occupations. While labour market conditions for marine-engineer officers improved slightly in 1987 over what they had been in the preceding few years, it is still not as favourable as they were prior to the 1981-82 recession.

Because employment in this occupational group is concentrated in the water transportation industry, it is susceptible to fluctuations in the economy. Seasonal variation is above average; employment peaks occur during the summer months. Relatively little part-time work is available in this occupation. Changing technology, while making the marine-engineer's job easier, is not likely to affect future employment levels much more.

Earnings

Pay ranges for this occupational group depend on seniority, travelling time and the supervisory aspects of the position, and range from $25,000 to $60,000 annually.

In 1986 the 49% of engineering officers who worked full-time over the full-year in B.C. earned an average annual employment income of $39,100.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	860	760	840

Annual Growth 1987-1995: 1.3%

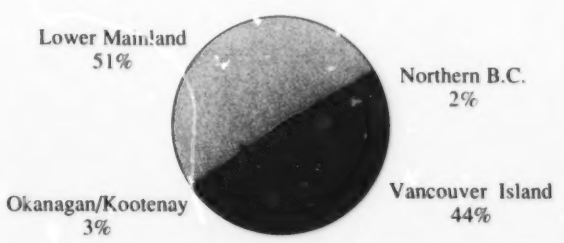
Main Industries of Employment 1986 Census

Water Transportation	68%
Government	11%
Food & Beverage Manufacturing	3%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
80	240	320

Employment by Region



▶ Deck Crew, Ship 9155

Nature of the Work
This group includes occupations concerned with deck and bridge duties aboard vessels that transport freight and passengers, tow ships, barges or log booms. They supervise and coordinate activities of deck crew, steer the ship as directed by a deck officer, stand deck watches, and maintain the ship's structural woodwork, wooden gear and deck equipment.

On towing vessels deck-hands may be required to work on log booms to secure tow lines, boom chains and anchoring devices. Potential towing industry officers must enter as deckhands.

Education and Skills
Employment in these positions requires a Grade 9 to Grade 12 education, although those who wish to pursue a career as a deck officer must have Grade 12. No experience is required for entry-level positions (deckhand), while 12-24 months of sea experience as a deckhand is required to qualify as a wheelsman/woman.

Some companies give preference to graduates of college nautical training programs. Pacific Marine Training Institute, Northwest and Camosun Colleges offer Deckhand and Deckhand Upgrading Programs. No license is required, however, experienced wheelsmen/women who also steer a ship must receive Canadian Coast guard endorsement.

As ships are becoming more complex, crews with advanced qualifications in technical subjects are needed for working on deck. Secondary school students have the opportunity to visit the premises of the Pacific Marine Training Institute in North Vancouver and participate in a special program "Marine Training for a Day" to gain an introduction to the marine industry and the growing demands for employment on Canadian ships. This introduction is designed to acquaint students with all academic and practical education requirements for employment in ships and provide assistance to students in developing their plans for a career at sea.

Good health and physical fitness are essential requirements for entry-level jobs. Before qualifying for these jobs, individuals must have a certificate from a physician affirming good vision, good hearing and good general physical health.

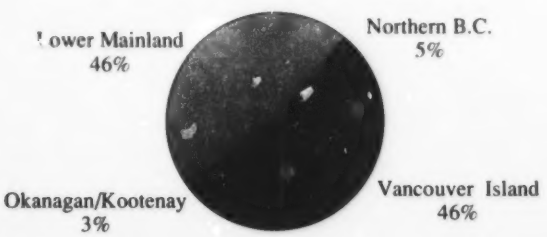
B.C. Job Prospects
Job growth in this occupation was well below average from 1981 and 1987 and projections to 1995 call for jobs to grow just below the average for all other occupations. This is a medium size occupational group in B.C. with the number employed in 1995 expected to be about 1,600. This includes an estimated 140 new job openings and 170 replacement openings expected over the next seven years. Unemployment in 1987 was above average and suggests that the employment opportunities in this occupation were not as favourable as most.

The federal fleet, including Fisheries & Oceans, Public Works, Defense Auxiliary and Coast Guard, the provincial ferry system, touring companies and the fishing industry are the main employers of deck crew in B.C.

Changes in the economy that affect the forest industry and port activity have a direct effect on the demand for deck crew in the B.C. towing industry. Seasonal variation with peaks during the summer and fall is another characteristic of all marine employment in B.C. There is very little part time work in this occupation.

Earnings
In 1986 the 47% of those who were full-time, full-year workers had an average annual employment income of $28,100.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,960	1,450	1,590

Annual Growth 1987-1995: 1.1%

Main Industries of Employment 1986 Census

Water Transportation	67%
Government	23%
Fishing	2%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
140	170	310

Nature of the Work

This occupational group includes all types of bus drivers, including school and tour bus drivers. Besides transporting passengers, they collect fares, keep simple clerical records and answer questions from passengers on scheduling. Tour and long distance bus drivers also are responsible for passenger baggage and freight. Their work environment is a clean, well-lit, heated vehicle. Bus drivers work shifts, sometimes split shifts.

The major sources of entrants to this occupation are secondary school graduates and people entering the labour force from the household sector.

An increasing number of women became bus drivers in the 1970s and early 1980s and now make up 13% of the employees in this occupation.

Education and Skills

Employment in this occupation usually requires a minimum age of 19. A good driving record and a Class 2 driver's license is required. Applicants have to pass qualifying examinations and usually undergo five weeks on-the-job training.

Bus drivers need emotional stability and a good temperament because public contact and dealing with heavy, fast-moving and stop-and-go traffic can be a strain.

B.C. Job Prospects

Employment in this group grew rapidly during the 1970s and has continued to grow steadily throughout the 1980s. However, projections to 1995 call for jobs to grow less than the average for all other occupations. This is a very large occupational group in B.C. with the number employed in 1995 expected to be almost 5,500. This includes an estimated 250 new job openings and 960 replacement openings expected over the next seven years.

Unemployment in 1987 was at the average of all occupations in B.C. and suggests that the employment prospects for bus drivers are as favourable as for most occupations.

Employment for this occupational group is mainly determined by population factors and is concentrated in the large urban areas of the province. Seasonal variation in employment exists and part-time work is slightly more common than in other occupations. Tourism gains in B.C. are expected to contribute to the employment growth of this occupation.

The normal path of advancement for drivers showing leadership is promotion to inspector, dispatcher, traffic supervisor or an administrative position.

Earnings

Drivers can expect an average income with a high degree of security. Although pay ranges vary slightly according to the community, they are generally higher in urban areas.

The 1986 Census data indicates that the 53% of bus drivers who worked full-time over the full-year in B.C. earned an average employment income of $30,000.

Non-union rates in the lower mainland ranged from $8.25 to $10.00 per hour in 1988, while union rates ranged from $10.60 to $16.53 per hour.

Since the hours become more convenient and steadier as seniority increases, the average operator can expect to maintain these earnings until retirement.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	4,220	5,220	5,470

Annual Growth 1987-1995: .6%

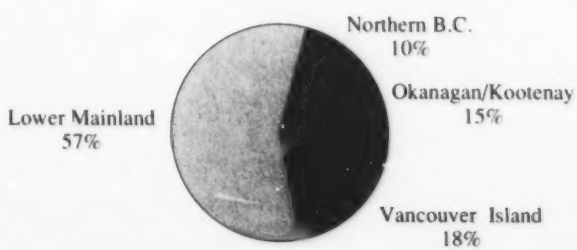
Main Industries of Employment 1986 Census

Urban Transportation	50%
Other Transportation	28%
Educational Services	18%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
250	960	1,210

Employment by Region



▶ Truck Drivers 9175

Nature of the Work

This occupation includes city delivery drivers, dump truck drivers, tow truck drivers, moving van drivers and workers who drive trucks or tractor-trailer combinations over long or short distances. They work in every industry and many own their own vehicles. Their job includes inspecting the vehicle, preparing it for loading and picking up delivery documents. Loading and unloading is usually handled by terminal and warehouse workers. In some cases the driver also may load.

Truck drivers need to know first aid, dangerous goods regulations, safety regulations, the rules of the road and defensive driving plus the operation of air brakes on larger trucks.

Their work week, depending on the nature of the job, is 40 to 60 hours long. Working conditions are generally not more hazardous than in other industrial occupations. Most drivers are men, although the number of women drivers is growing.

Education and Skills

A truck driver must have a good driving record. Some companies require a medical examination and have height and weight requirements. Employment usually requires a minimum age of 19 and Grade 10, with Grade 12 preferred, including an emphasis on automotive mechanics. Completion of a program in truck driving from a specialized driving school is an advantage. Drivers of heavy trucks require a Class 3 driver's license (Class 1 for tractor-trailers) and drivers of light trucks require a Class 5 license. Many positions, especially with heavier trucks, require drivers with valid Air-brake Certification.

Very few people enter truck driving directly from school. A person may be hired as a loader or driver's helper before being allowed to drive. Employers look for responsible, self-motivated people, since drivers work with little supervision.

B.C. Job Prospects

This is a very large occupational group in B.C. with an employment outlook for average growth over the next eight years, based on employment prospects for the truck transport, trade and manufacturing industrial sectors. Of the 5,000 new job opportunities estimated until 1995, 50% will come from new growth and 50% from people leaving this occupation.

Labour market conditions for truck drivers have not changed much over the past several years. Despite reasonable employment growth, even higher growth in the supply of truck drivers has led to some unemployment. There is a moderately high ratio of unemployed to employed among truck drivers. This reflects a poor employment situation for drivers of light trucks and a more balanced labour market situation for the more highly skilled who drive long-distance tractor-trailers.

Because employment of truck drivers is spread throughout all industries, with some concentration in transportation and trade, it is only mildly susceptible to fluctuations in the business climate. The level of part-time work is about average and seasonal variation in employment is limited.

Earnings

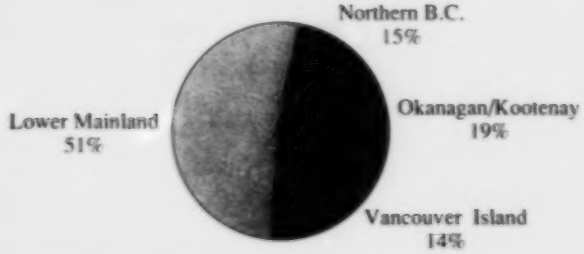
Pay ranges for truck and transport drivers vary more than in most occupations and depend on whether the driver operates a light or heavy vehicle.

In 1989 in the Vancouver area, hourly wages for delivery drivers in a union setting averaged from $9.75-$14.00, and non-union $6.00-$10.00. Unionized construction truck drivers averaged $11.00-$16.63, and non-union $10.00- $16.00. Long distance drivers averaged $13.00-$15.59 in a union setting and non-union made $10.00-$12.00.

Owner operator transport drivers can earn between $30,000 and $50,000 a year, and some may even exceed these amounts.

The 1986 Census indicated that truck drivers who worked full-time over the full-year in B.C. earned an average employment income of $28,500; the overall average was $22,500.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	30,380	25,000	27,540

Annual Growth 1987-1995: 1.2%

Main Industries of Employment 1986 Census

Transportation	46%
Retail & Wholesale Trades	15%
Various Manufacturing	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,540	2,470	5,010

93

Material Handling and Related Occupations

▼ ▼ ▼ ▼ ▼ ▼ ▼ ▼

▶ Hoisting Occupations 9311

Nature of the Work

These occupations are concerned with lifting and moving materials, machines, equipment and products. Worker functions include driving and operating power cranes, hoists and winches and ensuring load weights and hook-ups are done with safe operating practices. Activities include: controlling hoisting machinery by moving pedals, levers and buttons in proper sequence; estimating load weights, setting up rigging, positioning loads, attaching and unhooking loads; and inspecting, adjusting, cleaning and lubricating machinery, cables, ropes and slings.

Operators of tower cranes used to lift and move building materials around a construction site are among the most highly skilled hoisting equipment workers. At times the worker may not see either the pick up or delivery point and must follow hand signals or radio commands from another worker.

Other occupational titles in this group are floating crane operator, hoist operator, locomotive crane operator, tractor crane operator, truck crane operator, rigger, winchperson and crane chaser. Longshore workers who acquire experience with hoisting equipment may advance to appropriate occupations within this group.

With additional training and experience workers in these occupations may advance to occupations requiring higher skills. For example, a crane chaser may become a crane operator. Supervisory jobs are also available.

Education and Skills

The Mobile Crane Apprenticeship, when implemented, will consist of three terms of 1,500 hours, including in-school technical training. B.C. Trades Qualification (TQ) Certification will also be available in this trade. Students are advised that apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11.

Workers in hoisting occupations need to be alert and have a good sense of balance as well as good eye-hand-foot coordination and physical strength.

B.C. Job Prospects

This is a medium size occupational group with employment concentrated in forest products manufacturing (27%), in the construction industry (15%), in primary industries such as logging and mining (10%) and in the water transport industry (8%).

Employment in these occupations declined significantly during the early 1980s as a result of the economic downturn. Employment has been increasing since 1986 at a slightly below average rate but still remains below the 1981 level. Expectations are that employment will continue to grow at a slightly below average rate to 1995 with an estimated 150 new job openings and 230 replacement openings expected over the next seven years. A number of major construction projects are proposed for that period and their fulfillment would moderately enhance employment growth.

This occupation is more susceptible to economic conditions than many others in B.C. When work is scarce, workers in hoisting occupations may experience extended periods of unemployment between jobs. Work also tends to be less plentiful in some parts of B.C. during the winter months. These factors are reflected in an unemployment level that is a little above average.

Earnings

The 1986 Census data indicates that the 45% of employees who worked full-time over the full-year in B.C. earned on average an annual salary of $34,200.

Employment by Region

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	2,310	1,410	1,560

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

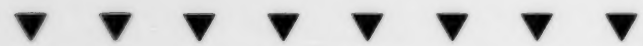
Forest Products Manufacturing	27%
Construction	15%
Logging & Mining	10%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
150	230	380

95

Other Crafts and Equipment Operating Occupations



Printing Press Occupations 9512

Nature of the Work

Commercial press operators, flexographic press operators and newspaper press operators are some of the occupations in this group. Press operators run letterpresses, offset presses, webb offset presses and other presses. Their work in preparing a press may include transferring a photographed image to a printing plate, installing the plate on the machine, applying ink to the plate and making fine mechanical adjustments. On a large press, the operator may be in a supervisory position. Press operators work indoors and are constantly moving around machinery.

Over 200 women are employed in these occupations, representing 12% of the workforce in this group.

Education and Skills

Vancouver Vocational Institute (VVI) offers a ten month entry-level program in Printing Production. It requires Grade 12 and graduates may look for entry- level work in the graphic arts industry or start an apprenticeship. The Graphic Arts/Printer Apprenticeship lasts five years (lithographic cold type) or six years (letterpress hot metal). The Graphic Arts/Letterpress and Lithographic Press Apprenticeships last four years. The Graphic Arts/Flexographic Press term is for two years. VVI also offers a part-time Printing Production/Apprenticeship Program leading to apprenticeship certificates in four major categories: bookbinding, computer photo typesetting, preparatory and press.

Apprenticeship employers prefer applicants with Grade 12, including English 12 and a math and science 11. College training is increasingly important because of the theoretical knowledge needed to operate advanced equipment, and courses in chemistry, electronics, colour theory and physics are recommended. Because of technical developments in the printing industry, training requirements are currently under review. As a result, the full scope of training and the types of jobs available may change.

B.C. Job Prospects

The employment projection is for slightly below average growth to 1995, based on employment prospects for the printing and publishing sector. This is a departure from the 1970s and early 1980s when employment grew faster than average, and this projection may indeed be too conservative. About 500 press operators will be needed to fill new jobs and to replace workers leaving these occupations. Unemployment in 1987 was below average suggesting that current labour market conditions for this occupational group are more favourable than for most occupations.

Employment trends differ for the various printing specialties. For example, little growth is anticipated for lithographic press operators because offset lithography is now the main process used in the commercial printing industry. Letterpress printing has also declined and will not contribute significantly to employment growth.

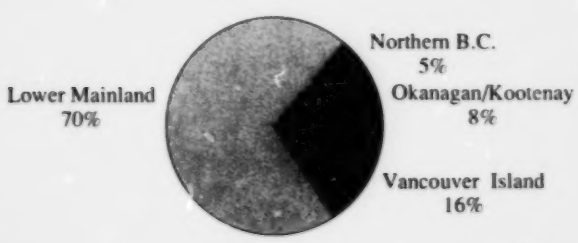
Employment in this occupational group is not especially vulnerable to changes in business conditions. New technology affecting high-speed equipment may curtail employment growth in this group. There tends to be little seasonal variation in employment and little part-time work, compared with other occupations.

Earnings

The Graphic Communications International Union lists the following 1989 hourly wage rates for printing press occupations: journeyman feeder $13.95-$18.21, sheetfeed pressman $21.23-$25.96, journeyman web pressman $23.04-$25.89, and web roll tender $18.21.

The 1986 Census indicates that the 74% of workers in the printing press occupations who worked full-time over the full-year in B.C. earned an average salary of $30,291. The overall average income was $26,500.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,600	2,310	2,550

Annual Growth 1987-1995: 1.3%

Main Industries of Employment 1986 Census

Printing & Publishing	80%
Business Services	2%
Paper Products	4%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
240	260	500

9539 Stationary Engine (Power Engineer) and Utilities Equipment Operating and Related Occupations

Nature of the Work

Stationary engineer, power engineer, air-conditioning operator, gas-compressor operator, and pipeline gauger are typical occupations in this group. Stationary engineers operate and maintain equipment such as steam turbines, steam boilers, instrumentation and process controls, air compressors, refrigerating systems, water conditioning systems, efficient control and chemical recovery systems.

Other duties include power and process operation, maintenance and administration of safety and efficiency standards. Stationary engineers must be familiar with a variety of instruments, hand tools and power tools. Their work involves exposure to high temperatures and contact with oil, grease, chemicals and odours.

Seasonality has little effect on workers in these occupations and almost 75% of all employees have permanent, full-time jobs. This is nearly twice the average for all occupations.

Education and Skills

Power engineers in B.C. must be certified at 4th through 1st Class levels. This usually takes between four and eight years, with each level a combination of training and qualifying time. Several colleges, including the Open Learning Agency, offer nine to ten month power engineering (4th Class) programs which prepare graduates for writing the provincial examination. Grade 12 or equivalent, with Algebra 11 and Physics 11 is usually required. Vancouver Vocational Institute offers the power engineering (3rd Class) program which takes nine months and requires a valid 4th Class Certificate and completion of a first year, engineering-related, post-secondary program at a technical institute or university.

A power engineering/tutorials & correspondence program is offered though several community colleges. It prepares students for employment as boiler operators, refrigeration operators, 4th through 1st Class power engineers in industry, and to write the appropriate provincial examinations. The length of time required for each program varies from two months to two years. A ten week refrigeration operator program is also available.

Workers in these occupations require good hand-eye coordination, manual dexterity, agility to climb stairs and ladders and to manipulate tools while in awkward positions. They also must be able to adapt to constant exposure to noise and vibration from operating equipment.

B.C. Job Prospects

Although employment increased slowly in the 1970s, it declined through the first half of the 1980s. Current projections suggest future employment growth will be slightly below average to 1995. Since an above average proportion of stationary engineers are in the 54-plus age group, the approximately 500 replacement openings will provide the major source of job opportunities. The lower-than-average unemployment level indicates that stationary engineers still experienced better labour market conditions than most occupations, despite the slower employment growth rate.

Stationary engineers are concentrated mainly in the manufacturing sector, while some work in the transportation, storage, communications, utilities and services sectors. They can expect good employment prospects throughout the projection period as it is anticipated that there will be moderate expansion in these areas.

Earnings

In 1989 in the Vancouver area, hourly rates for power engineers (4th Class) averaged $10.00-$18.00 in a non-union setting, and $12.27-$21.42 in a union setting. Unionized 3rd Class power engineers ranged from $13.38-$21.86 and unionized 2nd Class engineers ranged from $14.62-$22.54.

The 1986 Census indicates that the 72% of workers in this occupation who worked full-time over the whole year in B.C. earned an average annual salary of $34,400.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	3,500	2,620	2,970

Annual Growth 1987-1995: 1.6%

Main Industries of Employment 1986 Census

Manufacturing	4%
Education	6%
Hospitals	8%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
350	490	840

Employment by Region

▶ Radio and Television Broadcasting Equipment Operators 9551

Nature of the Work

This occupational group includes broadcast engineers, radio operators, telecasting technicians and videotape recording (VTR) operators. Radio and TV equipment operators electronically record or reproduce pictures or sounds. A variety of equipment is used including videotape recording and sound mixing equipment, video and audio consoles, sound/video synchronizing equipment and broadcast transmitters. At small stations, where specializations are less usual, operators may gain experience with several pieces of equipment.

The hours of work are variable and depend on the requirements of the position. A normal work week is five days and 40 hours.

Workers in these occupations require eye-hand-finger coordination to operate, set up, repair or adjust equipment as well as good hearing and visual acuity, including colour discrimination.

Over the period 1971 to 1986 women have increased their representation in these occupations substantially and now account for approximately 17% of the workforce in this group.

Education and Skills

Employment in these occupations usually requires high school graduation, completion of a college or institute of technology program in radio and television broadcasting, and on-the-job training of one to five years. BCIT offers a two year Broadcast Communications Program. Students can enroll in one of three options: Radio, Television or Broadcast Journalism. Because only a limited number of students can be accepted each year, applicants should apply early. Camosun College offers a two year Applied Communication Program. This program takes a generalist approach to mass communication and media applications, and includes practical assignments in audio and video production. Grade 12 is required.

B.C. Job Prospects

This is a small occupational group in B.C. with the number employed in 1995 expected to be about 430. Average growth is projected to 1995 including an estimated 50 new job openings and about the same number of replacement openings expected.

Labour market conditions for radio and TV equipment operators are currently better than average as indicated by low unemployment levels for this group. There is no seasonal employment pattern in these occupations and although part-time work is less frequent than in the labour market at large, it has been increasing.

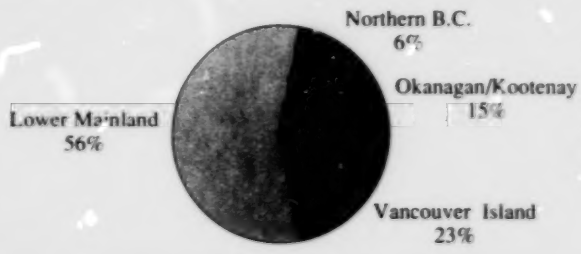
While more than half of the workers in this occupation are employed by radio and television broadcasting companies, they also work in forestry, telephone and telecommunications, and in business and government services.

Earnings

Wages for operators represented by the National Association of Broadcast Employees and Technicians (NABET) Union are negotiated in collective bargaining. Following are the minimum hourly rates of pay for freelance technicians and operators in January 1986: post-production sound mixer $24.50; sound assistant/boom operator $20.50; sound editor (features) $24.50; switcher $20.50; video/VTR operator $20.50; VTR editor (production) $22.50; and telecine operator $19.50.

The 1986 Census indicates that the 53% of employees in this occupation who worked full-time, full-year in B.C. earned an average employment income of $25,800; the overall average was $19,900.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	570	380	430

Annual Growth 1987-1995: 1.6%

Main Industries of Employment 1986 Census

Radio & Television Broadcasting	55%
Federal & Provincial Government	17%
Forestry	9%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
50	50	100

9555 Sound and Video Recording and Reproduction Equipment Operators

Nature of the Work

Audio engineers, radio recorders, sound editors, and studio technicians record and reproduce sound and video images for radio and television broadcasting. Depending on the specialty, associated duties may include developing and editing film, videotaping and audio recording on tape or disc. The work requires using electronic equipment and therefore involves exposure to noise. A five day work week of 40 hours based on shift rotations is normal. Overtime is periodically required.

Education and Skills

While high school graduation is the basic qualification for entry to this occupation, a community college or institute of technology program with emphasis on television or radio broadcasting is highly recommended and is becoming increasingly essential. A period of on-the-job training may also be required, depending on the individual's educational background and previous experience.

BCIT offers a two year Broadcast Communications Program with options in radio, television and broadcast journalism. Training includes on-air and off-air technical skills in all areas of broadcasting and related fields, such as audio and video production. Admission requirements include Grade 12, or the equivalent, and the ability to type correctly 25 words a minute.

B.C. Job Prospects

This is a very small occupation in B.C. with the number employed in 1995 projected to be about 350 indicating that employment will increase at an average rate. This is a lessening of growth as the occupation grew well above average between 1981 and 1987. This may reflect several factors, including the maturity of the industry, and slower growth in local movie production. An estimated 50 new job openings and 10 replacement openings are projected to 1995. If it is possible to expand local movie production there may be a few more opportunities. However, while important, this occupation is only a small one within the spectrum of jobs related to video/movie production.

A trend towards automation in the telecommunications industry may have a negative effect on employment prospects in this field. In comparison with other occupations, unemployment levels were average in 1987.

Employment prospects in the communications and services sectors, in which these occupations are concentrated, are moderate in the short term due to saturation within the broadcasting industry. However, a significant number of the workers are employed in other industries of the economy such as miscellaneous manufacturing (11%), education (8%), religion (3%) and recreation (14%). The incidence of part-time work increased slightly over a ten year period.

Earnings

The following are the 1986 minimum hourly rates of pay for free-lance technicians and operators represented by the National Association of Broadcast Employees and Technicians (NABET) Union: post production sound mixer $24.50; sound assistant/boom operator $20.50; sound editor (features) $24.50; switcher $20.50; video/VTR operator $20.50; VTR editor (production) $22.50; and telecine operator $19.50.

The 1986 Census indicates that the 40% of workers in this occupation who worked full-time over the whole year in B.C. had an average employment income of $29,600. The overall average was $17,000.

B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	210	300	350

Annual Growth 1987-1995: 1.9%

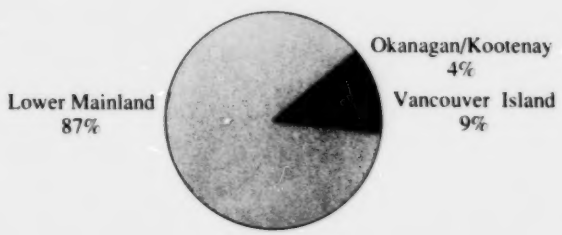
Main Industries of Employment 1986 Census

Radio & Television Broadcasting	50%
Recreation	14%
Miscellaneous Manufacturing	11%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
50	10	60

Employment by Region



Photographic Processing Occupations 9591

Nature of the Work

This classification includes processors of both still and motion-picture film, such as colour photo printers, enlargers, film and photograph developers. The work environment ranges from mass processing retail outlets to specialized custom photo labs. In the latter case, personnel are highly skilled and experienced. In all environments, there is some exposure to toxicity and fumes. New techniques used by photo processors include the laser removal of unwanted details from photographs and laser enhancement of photos reproduced from transparencies.

About half of workers in this occupation work full-time over the whole year. This is slightly higher than the all-occupation average. However, a large portion (11%) work in permanent part-time positions.

As of 1986, the number of women in this occupational group was slightly greater than the number of men.

Education and Skills

Employers of photographic processing workers prefer applicants who are high school graduates with courses in chemistry and mathematics. Completion of the two year Photography Program at Vancouver Community College is an asset. Admission requirements include Grade 12, with Chemistry 11, Physics 11 and Math 12. On-the-job training lasts from six months to two years, depending on the complexity of the job.

Manual dexterity, good vision, including normal colour perception, and good hand-eye coordination are important qualifications.

B.C. Job Prospects

Employment for photographic processors in B.C. is mainly concentrated in the service sector, and to a minor extent in the manufacturing and trade sectors. Seasonal factors have some influence on employment patterns. There were 1,130 people in these occupations in B.C. in 1987.

Labour market conditions for photographic processors have improved in the last several years with employment growth above average between 1981 and 1987. Expectations are that these occupations will grow at a below average rate between 1987 and 1995. This will translate into about 90 new jobs and 150 replacement openings.

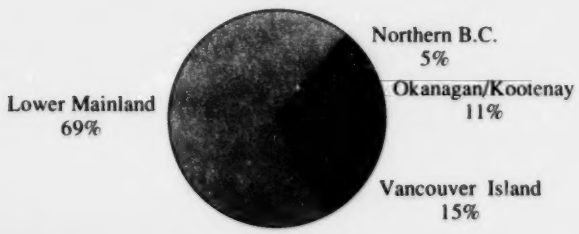
Technological innovations in photographic processes and equipment have had an impact on numbers of workers and their skills. Still photographic printing is being automated, reducing skill levels for many workers. However, new processes are also being brought into place for more elaborate art work. The video and motion picture spectrum is benefitting from both the technological innovation and increased film making demand, as it is now possible to provide initial processing in B.C.

Earnings

The earnings of photographic processors vary according to experience, qualifications, location, type of work and place of employment. Estimated hourly wages are $12.00 to $15.00. Reported 1986 earnings were $14.97 an hour for film developers and $12.87 an hour for enlargers.

The 1986 Census indicates that the 37% of full-time, full-year workers in B.C. had an average employment income of $17,100. The overall average was $11,300 which reflects the very high level of part-time employment in this occupation.

Employment by Region



B.C. Employment Trends & Projections

	1981	1987	1995
Number Employed	1,050	1,130	1,230

Annual Growth 1987-1995: 1.0%

Main Industries of Employment 1986 Census

Miscellaneous Services	67%
Retail Trade	5%
Printing & Publishing	5%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
90	150	240

General Career Information References

There are many public, semi-public and private organizations which provide information to help you explore and decide upon career choices. In addition to the Regional Colleges listed in Appendix 3 (most of which have Counselling Services), one or more of the following may also be of assistance to you. If you are still in high school, your counsellor may help you in finding those ones which might serve you best.

1. Canada Employment Centres

The variety and range of services depends on the size and the location of the Canada Employment Centre (CEC). CECs in the larger communities throughout the province all offer full services, whereas smaller CECs may not supply full counselling and insurance services.

Canada Employment Centres are operated on the campuses of all three public universities and BCIT. These offices are specifically prepared to assist both graduating and undergraduate students obtain work.

Canada Employment Centres for Students are operated in some 48 communities across B.C. These offices are specially organized to assist returning students obtain summertime employment, and operate during late April through early September only.

A computerized information system called CHOICES is also available. This program provides a great deal of labour market information, assistance in identification of potential careers and where suitable courses are located. CHOICES is offered in a limited number of offices. Interested users should contact their nearest CEC to confirm availability and/or to arrange an appointment.

Employment and Immigration Canada also supports specialized outreach services which focus on career and employment orientation. Outreach projects are sponsored by community organizations around the province as well.

2. B.C. Ministry of Advanced Education and Job Training, and Ministry Responsible for Science and Technology

a) Job Training (apprenticeship training) Regional Offices

These offices provide information on various kinds of on-the-job training arrangements including apprenticeship training and vocational rehabilitation for disabled persons. They are in the process of being integrated into Training and Enterprise Centres, which will also provide information on management and supervisory training, community and distance education, the Open Learning Agency and business/economic developments.

b) Open Learning Agency (OLA)

Incorporating the Open College, the Open University and the Knowledge Network, the Open Learning Agency offers a wide range of alternative routes to education and training, including T.V. programs, video tapes and personalized learning approaches. The OLA also provides an excellent career planning course and documentation to help you assess your own skills. This agency is particularly useful for those who experience physical, psychological, geographical or other constraints in finding the right information and will gradually be incorporated into Training and Enterprise Centres (see 2 a).

Regional Offi · phone toll-free 1-800-663-9711

3. B.C. Ministry of Social Services and Housing

This Ministry provides information on employment opportunities to social assistance recipients. The best access is through social workers.

4. Career Resource Centres

These centres include Employment Orientation and Women's Resources Centres. Services vary but are often focused on specific groups, e.g., youth, women and Native Indians.

5. Libraries

Libraries provide valuable employment related information and some have organized sections for this service. Ask your librarian.

6. Professional and comparable occupation-specific organizations

The occupation-specific text in this book contains many references to professional and occupational bodies offering employment related information. Otherwise, consult the telephone book or call one of the above agencies.

7. Computerized career decision-making programs

Such programs are available at high schools, colleges, the Open Learning Agency and some libraries.

A Note About Apprenticeship Employment in British Columbia

The apprenticeship process in British Columbia begins when a prospective apprentice approaches an employer who can act as a sponsor and provide provincially acceptable on-the-job training. The employer then applies to the Job Training Division of the Ministry of Advanced Education and Job Training, and Ministry Responsible for Science and Technology to register the apprentice. Apprentices then sign a contract saying they will do their best to learn, and their employer signs a contract agreeing to teach them the trade. The apprenticeship term lasts from two to five years (during which time the apprentice is paid) and results in the apprentice achieving journeyman/woman status. Apprenticeships usually include four to six weeks of compulsory, in-school technical training each year as well as on-the-job training throughout the year.

The Provincial Apprenticeship and Training Board strongly recommends that students complete Grade 12. Although the minimum education requirements for some of the trades is successful completion of Grade 10 or equivalent, most apprenticeship employers prefer applicants with Grade 12 including English 12, a mathematics 11 and a science 11. The recommended education requirements for the Piping, Electrical, Millwright/Machinist, Electronics, Motor Vehicle and Marine Engineer trades is successful completion of Grade 12, including English 12, Algebra 11 and Physics 11.

To help inexperienced applicants find apprenticeship employment, BCIT and most of B.C.'s community colleges offer Entry Level Trades Training (ELTT) programs. Since these programs introduce the students to the basics of the trade and thereby relieve apprenticeship employers of the task, completion of an ELTT program is increasingly being asked of apprenticeship applicants. Graduates of ELTTs usually receive credit for first year technical training when they become indentured as apprentices. In addition, they normally receive six months time credit off their term of apprenticeship. However, each individual employer must first agree to this time credit. Cooperative education programs which integrate paid work experience with training are also available in a few trades.

Formal, accredited apprenticeship training is an advantage in today's competitive job market. Although a B.C. Certificate of Qualification (TQ Certificate) is compulsory only in the Plumbing, Refrigeration, Commercial Roofing, Sheet Metal, Sprinkler Fitting and Steamfitting/Pipefitting trades, job applicants in other trades frequently require this certificate to confirm their qualifications when seeking employment. For those who have not had the benefit of completing a formal apprenticeship in B.C., but who have worked in the trade as long as the apprenticeship period for that trade (plus one year further experience), TQ certification is available after successful completion of a trade examination. As the TQ pass rate for those without formal training is low, TQ refresher courses are recommended and these are available at BCIT and most community colleges. Holders of British Columbia TQ certificates in an interprovincial trade are also eligible to write the exam for interprovincial red seal certification. This allows the holder to practice in all provinces and territories without a re-examination of trade qualifications.

To help you decide which route into a trade is best for you, talk with a vocational counsellor in a high school, community college or at the Open Learning Agency. Apprenticeship counselling and information is also provided at your nearest Job Training Division of the Ministry of Advanced Education and Job Training, and Ministry Responsible for Science and Technology.

DIRECTORY

Colleges, Institutes and Universities in British Columbia

COLLEGES

Camosun College **592-1281**
Lansdowne Campus
3100 Foul Bay Road
Victoria, B.C. V8P 4X8

Carey Road Campus 388-6523
3814 Carey Road
Victoria, B.C. V8Z 4C4

Interurban Campus 479-7141
4461 Interurban Road
Victoria, B.C. V8X 3X1

Capilano College **986-1911**
2055 Purcell Way
North Vancouver, B.C.
V7J 3H5

Squamish Campus 892-5322
37827-2nd Avenue
Box 1538
Sechelt, B.C. V0N 3G0

Toll Free (Vancouver) 986-3515

Sechelt Campus 885-9310
5627 Inlet Avenue
Box 1609R
Sechelt, B.C. V0N 3A0

Cariboo College **828-5000**
900 College Drive
Box 3010
Kamloops, B.C. V2C 5N3

Williams Lake Campus 392-6202
51 Hodgson Road
Williams Lake, B.C.
V2G 3P7

College of New Caledonia **562-2131**
3330-22nd Avenue
Prince George, G.C. V2N 1P8

Douglas College **520-5400**
700 Royal Avenue
Box 2503
New Westminster, B.C.
V3L 5B2

East Kootenay Community College **489-2751**
2700 College Way
Box 8500
Cranbrook, B.C. V1C 5L7

Fraser Valley College **792-0025**
East Campus
45600 Airport Road
Chilliwack, B.C. V2P 6T4

West Campus 853-7441
33844 King Road
R.R. #2
Abbotsford, B.C. V2S 4N2

Kwantlen College **588-4411**
Box 9030
9260-140th Street
Surrey, B.C. V3T 5H8

Richmond Campus 273-5461
5840 Cedarbridge Way
Richmond, B.C. V6X 2A7

Newton Campus 591-1111
13479-77th Avenue
Newton, B.C. V3W 6Y1

Malaspina College **753-3245**
900 Fifth Street
Nanaimo, B.C. V9R 5S5

Cowichan Campus
(Duncan) 748-2591
222 Cowichan Way
R.R. #6
Duncan, B.C. V9L 4T8

Powell River Campus 485-2878
3960 Selkirk Way
Powell River, B.C. V9A 3C6

North Island College **339-5551**
156 Manor Drive
Comox, B.C. V9N 6P7

Northern Lights College **782-5251**
11401-8th Street
Dawson Creek, B.C. V1G 4G2

Northwest Community College **635-6511**
5331 McConnell Avenue
Box 721
Terrace, B.C. V8G 4C2

Prince Rupert Campus 624-6054
820-3rd Avenue West
Prince Rupert, B.C.
V8J 1M6

Okanagan College **762-5445**
1000 KLO Road
Kelowna, B.C. V1Y 4X8

Penticton Campus 492-4305
1296 Main Street
Box 640
Penticton, B.C. V2A 6P1

Kalamalka Campus
(Vernon) 545-7291
7000 College Way
Vernon, B.C. V1B 2N5

Salmon Arm Campus 832-2126
2690 Okanagan Avenue
Box 189
Salmon Arm, B.C.
V0E 2T3

Selkirk College **365-7292**
Beinder Way
Box 1200
Castlegar, B.C. V1N 3J1

Nelson Campus 352-6601
2001 Silver King
Nelson, B.C. V1L 1C8

Trail Campus 368-5236
845 Victoria Street
Trail, B.C. V1R 3T3

Vancouver Community College **875-1131**
1155 East Broadway
Box 24700, Station C
Vancouver, B.C. V5T 4N4

Langara Campus 324-5511
100 West 49th Avenue
Vancouver, B.C. V5Y 2Z8

King Edward Campus 875-6111
1155 East Broadway
Vancouver, B.C. V5T 4N4

Vancouver Vocational 681-8111
Institute
250 West Pender Street
Vancouver, B.C. V6B 1F9

INSTITUTES

British Columbia Institute 434-5734
of Technology
3700 Willingdon Avenue
Burnaby, B.C. V5G 3H2

Emily Carr College 687-2345
of Art and Design
1399 Johnston Street
Granville Island
Vancouver, B.C. V6H 3R9

Justice Institute 228-9771
of British Columbia
4180 West 4th Avenue
Vancouver, B.C. V6R 4J5

Pacific Marine Institute 985-0622
265 West Esplanade
North Vancouver, B.C.
V7M 1A5

UNIVERSITIES

Simon Fraser University 291-3111
Burnaby, B.C. V5A 1S6

University of British Columbia 228-3014
204-2075 Wesbrook Mall
Vancouver, B.C. V6T 1Z2

University of Victoria 721-7211
University Centre
Box 1700
Victoria, B.C. V8W 2Y2

OTHER

Open Learning Agency 660-2224
7671 Alderbridge Way
Richmond, B.C. V6X 1Z9

Students: 660-2221
Box 94000

Toll free number 1-800-663-9711

Knowledge Network 668-3300
300-475 West Georgia
Vancouver, B.C. V6B 4M9

PROGRAM TABLES

INTRODUCTION

The program tables are not intended to replace institutional calendars but to serve as a guide to the variety of programs offered by the B.C. post-secondary system.

A program, in the present context, is defined as a structured progression of courses constituting training or education in trades, vocational, technical, professional and academic fields of learning.

SYMBOLS

V = Various Courses

Various credit and non-credit courses are sometimes given in fields where no actual program is offered by the institution.

T = Training

This symbol indicates structured training intended to satisfy the requirements of a trade or a clerical occupation. The length of training varies from a few weeks to a few months.

C = Certificate

A certificate program involves one year or less of full-time study at a college or institute, usually as preparation for employment. Entrance requirements are Grade 10 completion, or higher, with specific grade and subject requirements. University level certificates usually take a year to complete, with admission requirements being secondary school graduation, or equivalent, or mature student status.

D = Diploma

This symbol refers to three different types of diplomas:

The college and institute diploma, which involves two years of study, usually in preparation for employment. Some colleges also offer an academic diploma after two years of university transfer courses. Entrance requirements usually include secondary school graduation, or equivalent, with specific grade and subject prerequisites.

The Emily Carr diploma, which takes four years to complete and includes admission requirements of secondary school graduation, or equivalent, experience in the field and submission of a portfolio.

The university diploma, which is usually offered at the post-baccalaureate level and requires two years to complete.

UT = University Transfer

This symbol refers to academic courses which are transferable to a university program. Where both "UT" and "D" are present, they indicate that the college also offers an academic credential after two years of UT courses, usually called an Associate in Arts/General Studies/Science Diploma.

B = Bachelor's Degree Program

This symbol refers to various types of bachelor's degrees, depending on the discipline, e.g. Bachelor's of Arts (B.A.), of Science (B.Sc.), of Applied Science (B.A.Sc.), of Science in Nursing (B.S.N.). Completion of these programs usually takes four years. Admission requirements vary according to the Faculty or School selected. Most require secondary school graduation, with appropriate grades and prerequisite courses, but others (e.g. Law, Architecture) require more advanced standing.

M = Master's Degree Program

As with the previous symbol, this one covers a number of credentials, e.g. Master of Arts (M.A.), of Science (M.Sc.) and usually indicate an advanced degree in the same field as the bachelor's. Exceptionally, they may refer to a first professional credential, such as a library degree (M.L.S.). Admission to a master's program usually includes completion of a bachelor's degree.

Ph.D. = Doctoral Degree Program

A doctoral degree in academic fields and many professional fields is usually identified as a Doctorate of Philosophy (Ph.D.). However, in the tables, this symbol applies to a number of doctoral degrees other than the Ph.D. proper, e.g. Doctor of Medicine (M.D.), Doctor of Dental Medicine (D.M.D.). Admission to the doctoral program usually requires completion of a master's degree or a bachelor's degree with special qualifications.

SYMBOLS

V Various courses
T Training
C Certificate
D Diploma
UT 1st/2nd year academic/ University transfer
B Bachelor's Degree
M Master's Degree
PhD Doctoral Degree

	COLLEGES									
	Camosun	Cariboo	Capilano	New Caledonia	Douglas	East Kootenay	Fraser Valley	Kwantlen	Malaspina	North Island
ACADEMIC UPGRADING										
Adult Basic Education/Literacy Instruction	C	C	C	C	C	C	C	C	C	C
English as a Second Language	T		T	T	T	T	T			T
AGRICULTURAL SCIENCES										
Agriculture (various specializations)						UT	D,UT			
Apiculture (Beekeeping)									T	
Animal Health/Pre-Veterinary Program			V,D							
Chemical/Biological Sciences/Technologies	UT									
Farrier								T		
Food Processing/Food Science										T
Horticulture/Landscape Architecture		C	C			D		C	T,C	
Orchardist (commercial and practical)										
ARCHITECTURE & PLANNING										
Architectural Drafting				T			T	T		
Architecture										
Community & Regional Planning										
ARTS – FINE, APPLIED & PERFORMING										
Art History	UT	V,UT	UT				UT	UT	UT	
Graphic Design/ CommercialArt		D	D				D	D	D	UT
Dance										
Fashion Arts/Apparel Design							D	C,D		
Fine Arts/Visual Arts	D	UT,D	D	T			C,D	UT,D	UT,D	UT
Media Arts - Animation, Film, Television										
Music (Vocal, Instrumental,Performance)	D	UT,D			UT,C		UT,T			
Music Therapy		D								
Musical Instrument Construction/Repair					C					
Photography									V	
Stagecraft Technology/Production Theatre Design/Acting		UT	UT,C		UT	UT,D	UT,D		UT,D	
Theatre Studies					UT	UT	UT,D			
Three-Dimensional Art (Sculpture, Ceramics/Textiles)	D	D,C					D		UT,D	UT
ARTS & HUMANITIES										
Asian Languages/Literature and Pacific Studies		V,UT			V					
Canadian Literature/B.C. Studies	UT,D	UT,D					UT	UT	UT	
Classics									UT	UT
English Language/Literature	UT,D	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
Ethnic Relations										

	INSTITUTES										UNIVERSITIES			
	Northern Lights	Northwest	Okanagan	OLA Open College	Selkirk	Vancouver Community College	BCIT	Emily Carr	Justice Institute	Pacific Marine	OLA Open University	Simon Fraser University	University Of British Columbia	University Of Victoria
	C,D	C	C,D	C	C,D	C,D						C		
	T	T	T	T	T	T						V	V	V
	C,D												B,M,PhD	
	V											V,C		
												UT	UT	UT
							T,D					V		
							T,D						B,M,PhD	
							T,D						B	
				C										
				T		T	T,C							
							T,D						B,M	
												V	M,PhD	
	UT		UT,D			UT		V				V	D,B,M,PhD	B,M
	V				C	D		D						
	C,D											B	V	
	UT,D		D			D		D			V	B	B,M	D,B,M
							D	D				B	D,B,M	
												B	B,M,PhD	B,M,PhD
	V		V		C	D		D				V	V	V
	V					UT,D						B	B,M	B,M
												B	B,M,PhD	B,M
								D					V	V
			UT			UT,D						V,C	B,M,PhD	B
	V		UT		UT	UT,D						C,B	V	B
						UT,D						V	B,M,PhD	B,M
	UT	UT,D	UT,D		UT	UT,D					B	B,M,PhD	B,M,PhD	B,M,PhD
												D		

SYMBOLS

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- UT 1st/2nd year academic/ University transfer
- B Bachelor's Degree
- M Master's Degree
- PhD Doctoral Degree

	COLLEGES									
	Camosun	Cariboo	Capilano	New Caledonia	Douglas	East Kootenay	Fraser Valley	Kwantlen	Malaspina	North Island
Germanic Languages/Literature		UT	UT		UT	UT,V				
History	UT,D	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
Humanities/Liberal/General Studies					UT		UT			
Latin American Studies										
Linguistics					UT				UT	
Philosophy	UT,D	UT,D	UT	UT	UT	UT	UT		UT	UT
Religious Studies						UT	UT			
Romance Languages/Literature	UT,D	UT,D	UT	UT	UT	UT,V	UT		UT	UT
Slavic Languages/Literature							UT			
BIOLOGICAL SCIENCES										
Biochemistry/Microbiology			UT	UT		UT				
Biology	UT	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
Botany									UT	
Genetics										
Marine Science/Oceanography									UT	
Zoology									UT	
BUSINESS/COMMERCE, MANAGEMENT & ADMINISTRATION										
Accounting Management	D		D	D	D	D	C		C,D	
Business Admin. (various specializations)	UT,D	D	UT,C,D	C,D	C,D	C,D	C,D	D	C,D	UT,D
Commerce (various specializations)	UT	UT	UT	UT	UT,D	UT			UT	
Computer Systems Management	D	D	D	D	C,D	D	D	D	D	D
Construction Management				D	D					
Financial Managment	D	D	D	D	D	V		D	D	
Industrial Supervision/Relations/Admin.								D		
Insurance (general)										
Management and Systems Science										
Management for Foresters/Engineers										
Marketing Management	D	D		D	D	V		D	D	
Municipal Government Administration	C		C						C,D	
Operations Management										
Organizational Behaviour										
Pacific Rim Business/International Business	D	D								
Public Administration	D									
Realty Appraisal/Real Estate/ Urban Land Economics										
Small Business/Retail/ Entrepreneurial/Management	C	D		T		C			C	C
Transportation/Distribution Management					V					

	INSTITUTES										UNIVERSITIES			
	Northern Lights	Northwest	Okanagan	OLA Open College	Selkirk	Vancouver Community College	BCIT	Emily Carr	Justice Institute	Pacific Marine	OLA Open University	Simon Fraser University	University Of British Columbia	University Of Victoria
			UT,D			UT,D						V	B,M,PhD	B
	UT	UT,D	UT,D		UT	UT,D					B	C,B,M,PhD	B,M,PhD	B,M
											B	C,D,B	V	B
												B	B	
												B,M,PhD	D,B,M,PhD	D,B,M,PhD
	UT		UT,D			UT					V	B	B,M,PhD	B,M
	UT		UT,D			UT							B,M,PhD	
	UT	UT,D	UT,D		UT	UT					V	B,M,PhD	B,M,PhD	B,M
													B,M,PhD	B
			UT									B,M,PhD	B,M,PhD	B
	UT	UT,D	UT,D		UT	UT					B		B,M,PhD	B,M,PhD
			UT,D										B,M,PhD	
			UT,D			D						V	M,PhD	V
												V	M,PhD	V
													B,M,PhD	
	UT	C,D	V		D	D	D					V	D,B,M,PhD	
	C	C,D	D	C,D	UT,D	D	D				B	M	B,M,PhD	
			UT		UT	D						V	B,M,PhD	V
		D	D		D	D	D						M,PhD	
				C		V	C							
			V	V		D	D		V		V	V	B,M,PhD	
				C								V	B,M,PhD	
						D								
												B	M,PhD	
												V	C	
			V		D	D	D					V	D,B,M,PhD	
												V		V
			V				D		V			V		
													B,M,PhD	
						D							M,PhD	
											V	V		D,M
						C,D	T,D						D,B,M,PhD	
	V		C	C		D	D					V		
							D					V	B,M,PhD	

SYMBOLS

- V Various courses
- T Training
- C Certificate
- D Diploma
- UT 1st/2nd year academic/ University transfer
- B Bachelor's Degree
- M Master's Degree
- PhD Doctoral Degree

	COLLEGES									
	Camosun	Cariboo	Capilano	New Caledonia	Douglas	East Kootenay	Fraser Valley	Kwantlen	Malaspina	North Island
CLERICAL										
Bookkeeping/Accounting	C	C	C	C	C	C	C	C	C	C
Clerk Typist		T,C	T,C	T,C	T,C	T,C		T,C	T,C	T,C
Computer Applications	T	T,C	C	T		T	T	T	T	
Dental Receptionist								T		
Office Administration/Secretarial	T,C	T,C	T,C	T,C	T,C	T,C	T,C	T,C	T,C	T,C
Office Clerk			C			T	T	T	T	T
Office Management/Office Systems					D					
Secretarial (both legal and medical)	C	C	C	C	C	C	C	C	C	C
Word Processing	C	C	C	C	C	C	C	C	C	C
COMMUNICATIONS										
Communications Arts/Studies	UT				UT			UT		
Electronic Publishing										
Journalism – Print & Broadcast Commun.			C					C		
Media Resources/Applied Communications	D	D								
Public Relations/Publishing								C,D		
Writing (Creative/Technical, Editing)		V	UT		UT	V		UT		
COMMUNITY/SOCIAL SERVICES PROGRAMS										
Child Care (Counselling)					C					
Early Childhood Education & Care	C	C	C	C	C,D	C	C		C	C
Family Science										
Firefighting(Indust./Prof./Volunteer)										
Nanny								T	T	
Social Work				C,UT	C	T,C			UT,C	
Sign Language Communication				C		V				V
Therapeutic Recreation Technician					C,D					
EDUCATION										
Education (various specializations)				UT					UT	
Native Indian Education Programs	UT			T			UT			
Special Education/Learning Disabilities				T,C	T,C	T,C		T,C	T,C	V
ENGINEERING & RELATED TECHNOLOGIES										
Aircraft Maintenance & Aircraft Structure										
Aviation Technology (Pilot Training)							D			
Appliance Repair				T,C					T,C	
Automation/Robotics								T		
Building/Construction Technology				D						

	INSTITUTES									UNIVERSITIES				
	Northern Lights	Northwest	Okanagan	OLA Open College	Selkirk	Vancouver Community College	BCIT	Emily Carr	Justice Institute	Pacific Marine	OLA Open University	Simon Fraser University	University Of British Columbia	University Of Victoria
	C	C	C	C	C	C	V							
	T,C	T,C	T,C	T,C	T,C	T,C								
	C	T	T		T	T, C	V		V,T			V		
	T,C	T,C	T,C	T,C	T,C	T,C	V		V					
	T	T	T		T	T,C								
		D	T,C	C		T,C								
	C	C	C	C	C	T,C	V							
	C	C	C		C	T,C	V							
						UT						B,M,PhD	V	
					C	T,C						V		
						C,D	D							V
												V		
												V		
		V			C	UT	V					V	B,M	B
						UT			V				V	B
	C	C	C		C	T,C						V		
													B,M	
									T					
	V	UT,C	UT,D		C	D			V,T,C		V		B,M	B
						C								
			C			T								
	UT		UT			T,C						D,B,M,PhD	B,M,PhD	B,M,PhD
						T						V	V	
			T,C			T,C						V	B,M,PhD	V
	D						T,C							
					D		V							
					T,C		T,C							
							T,D					B	V	V
						C	T,D						V	

SYMBOLS

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- B Bachelor's Degree
- M Master's Degree
- PhD Doctoral Degree

	COLLEGES									
	Camosun	Cariboo	Capilano	New Caledonia	Douglas	East Kootenay	Fraser Valley	Kwantlen	Malaspina	North Island
CAD/CAM Technologies/Manufacturing Engineering Technology	D		C,D	C						
Chemical Engineering										
Civil/Structural/Engineering/Technology	D									
Computer Aided Drafting & Design			D	T,C				T,C		V
Engineering Science										
Engineering Transfer Program			UT	UT		UT			UT	
Diesel Electric Power Mechanics									T	
Drafting Trade/Technician				C,D		V	T,C	T,C		C
Electrical/Computer/Electronics Engineering/Technology	D			D				D	D	D
Marine Engineering& Nautical Training	T									T
Mechanical Engineering/Technology	T									
Mechanical Systems Technology										
Metals/Materials Engineering										
Mining Engineering/Technology										
Petroleum Technolgy										
Plastics Technology								C		
Surveying				T						
FORESTRY & RESOURCE MANAGEMENT										
Aquaculture		T,C							C,D	C
Forestry (various specializations)				UT		V				
Forest Resource Technology				D					D	
Forestry Crewperson				C		C			C	C
Environmental Science (var. specializations)	V									
Log Scaling				T		T			T	V
Natural Resource Management									D	
Pest Management/Entomology										
Tree Trimmer Trade										
Wood Products Manufacturing/Pulp & Paper Engineering						V				
HEALTH/MEDICAL SCIENCES & TECHNOLOGIES										
Ambulance Attendants/Paramedics										
Audiology/Speech Sciences										
Biomedical Electronics Electrophysiology Technology										
Clinical/Biomedical Engineering/ Prosthetics & Orthotics										
Continuing Health Care Administration									C	
Dental Assistant	C			C	C	C	C		C	
Dental Hygiene				D						

	INSTITUTES						UNIVERSITIES					
Northern Lights	Northwest	Okanagan	OLA Open College	Selkirk	Vancouver Community College	BCIT	Emily Carr	Justice Institute	Pacific Marine	OLA Open University	Simon Fraser University	University Of British Columbia	University Of Victoria
C						T,D						V	
												B,M,PhD	
		D				D						B,M,PhD	
					T,C	V						V	
											B,M	B	
		UT		UT							UT		
					T,C	T,C							
			T,C		T,C	T,C							
		D		D	T,C	T,D					V	B,M,PhD	B,M,PhD
	T								T,V			V	
						D						B,M,PhD	
						D						V	
												B,M,PhD	
						UT,D						B,M,PhD	
						T,D						V	
V						D						V	
		V				T,D						V	
	T,C	V									V	V	V
		UT		UT						UT	V,UT	B,M,PhD	
	D			D		T,D					V		
C	C					T,C							
				UT							V,D	B,M,PhD	B
	T												
T,D				D		D					M	M,PhD	V
											M	V	
						T,C							
						T,D						B,M,PhD	
								T					
												M,PhD	
						T,D							
						T,D					B	M	
						V							
		C	C		C								
					D						UT		

SYMBOLS

- V Various courses
- T Training
- C Certificate
- D Diploma
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	COLLEGES									
	Camosun	Cariboo	Capilano	New Caledonia	Douglas	East Kootenay	Fraser Valley	Kwantlen	Malaspina	North Island
Dental Mechanic/Technician										
Dentistry (D.D.S.) & Graduate Programs										
Diagnostic Med. Sonography (Post Diploma)										
Environmental Health/Public Health Insp.										
Health Records Administration						T				
Hospital Unit Assistant										
Industrial First Aid/Health & Safety										
Kinesiology										V
Longterm Care/Handicapped/Home Support	C	C	C	C	C	T,C	C	C	C	C
Medical Laboratory Technology/Science			D							
Medical Radiography Technology										
Medicine (M.D.)/Graduate Programs										
Nuclear Medicine Technology										
Nursing (Diploma/Degree)	D		D	D	D	T	T	D	D	T
Nursing (Prof. diploma specializations)										
Nursing (Practical LPN)	C								C	
Nursing (Psychiatric)					D					
Occupational Health & Safety									T	
Pharmacy/Pharmacology (var. specializations)										
Pharmacy Technical Assistant										
Physio/occupational Therapy										
Respiratory Therapy			D							
LAW & RELATED STUDIES										
Court Reporter										
Correctional Officer										
Criminology	D,UT			D,UT	C,D,UT		D,UT	C,D,UT	UT	
Deputy Sheriff										
Law (various specializations)										
Police Officer										
Legal Assistant		D								
Probation Officer										
LIBRARY SCIENCES										
Library Technician							D,UT			
Library Studies										
Archival Studies/Public History										
MATHEMATICAL SCIENCES										
Computer Science	UT	UT,D	UT	UT	UT	UT	UT	UT	UT	UT

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						D								
												UT	M,PhD	
							T,D							
							T,D							
							T,D							B
						T								
	T	T,C	V		T				T					
											V	D,B,M,PhD		
	C	C	C		C	C								
							T,D						B	
							T,D							
												UT	M,PhD	
							T,D							
	T	T	D		D	D	D				V		B,M	B
							D							
			C		C	C								
							T,C,D					V		
												UT	B,M,PhD	
						T,C								
				T									B	
						C,D	T							
									T					
	C,UT					D			V,T		V	C,B,M,PhD		
									T					
													B,M	B
									T					
						T,C								
									T					
						D								
													M	
												D,C	M	
	UT	UT,D	UT,D		UT	UT,D	V				B	B,M,PhD	B,M,PhD	B,M

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	COLLEGES									
	Camosun	Cariboo	Capilano	New Caledonia	Douglas	East Kootenay	Fraser Valley	Kwantlen	Malaspina	North Island
Mathematics	UT,D	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
Statistics				UT	UT	UT			UT	UT
PHYSICAL EDUCATION & RECREATION										
Aquatic Recreation Leadership	C									
Health & Fitness/Human Performance/Recreation		C			V				D	
Physical Education (various specializations)				UT	UT	UT			UT,D	
Recreation Facilities Management									D	
Recreation/Management		D	D			T,D			D	
PHYSICAL SCIENCES										
Astronomy									UT	UT
Chemical Physics/Applied Physics				UT						
Chemistry	UT,D	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
Geology	UT,D	UT,D	UT	UT	UT	UT			UT	UT
Physics	UT,D	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
SOCIAL SCIENCES										
Anthropology	UT,D	UT,D	UT	UT	UT	UT		UT	UT	UT
Archaelogy									UT	
Economics	UT,D	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
Geography (Human/Physical)	UT,D	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
Gerontology										
Political Science	UT,D	UT,D	UT		UT	UT	UT	UT	UT	UT
Psychology(Arts/Science)	UT,D	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
Psychology (Clinical)										
Sociology	UT,D	UT,D	UT	UT	UT	UT	UT	UT	UT	UT
General Studies					D		UT,D			
Women's Studies		UT,D			V					
TOURISM/FOOD SERVICES/HOSPITALITY/PERSONAL SERVICES										
Bartending		T,C		T,C		T,C			T,C	T,C
Commercial Baking									T	
Cook Training (various levels)	C		C	C		C			C	
Hairdressing, Man's Hairstyling, Esthetics						C				
Dietetics/Nutrition										
Dining Room & Lounge Supervisor	C		C			T,C			C	
Food Service Technician		T,C								T,C
Kitchen Management										
Meat Processing (Sausages/Smoked meat)			T,C							
Waiter/Waitress		T		T		T,C			T	T

	INSTITUTES										UNIVERSITIES			
	Northern Lights	Northwest	Okanagan	OLA Open College	Selkirk	Vancouver Community College	BCIT	Emily Carr	Justice Institute	Pacific Marine	OLA Open University	Simon Fraser University	University Of British Columbia	University Of Victoria
	UT,D	UT,D	UT,D	UT	UT	UT	V				B	B,M,PhD	B,M,PhD	B,M
	UT	UT	UT,D			UT	V				V	B,M,PhD	B,M,PhD	V
									V,T			C	B	B
					UT	UT						V	B,M	B,M
						D								
						D						V		
			UT									V	V	B
												B,M		
	UT	UT,D	UT,D		UT	UT						B,M,PhD	B,M,PhD	B,M,PhD
		UT,D	UT,D		UT	UT						V	B,M,PhD	
	UT	UT,D	UT,D		UT	UT						B,M,PhD	B,M,PhD	B,M,PhD
	UT	UT,D	UT,D		UT	UT					V	B,M,PhD	B,M,PhD	B,M
			UT,D									B,M,PhD	V	V
	UT	UT,D	UT,D		UT	UT					B	B,M,PhD	B,M,PhD	B,M
	UT	UT,D	UT,D		UT	UT					B	B,M	B,M,PhD	B,M,PhD
												D	V	
	UT	UT,D	UT,D			UT						B,M,PhD	B,M,PhD	B,M
	UT	UT,D	UT,D		UT	UT					B	B,M,PhD	B,M,PhD	B,M,PhD
												M		
	UT	UT,D	UT,D		UT	UT					V	B,M,PhD	B,M,PhD	B,M
	D		D								B	B		
	V		UT,D			UT						M	V	B
		T,C	T		T,C		V							
		T			T,C	T,C	T,C							
	C	C	C		C	C	C							
					C	C								
						D						V	B,M,PhD	
					C	T,C								
						T,D								
						T,C								
							T							
	T	T	V,C		T	T,C								

SYMBOLS

- V Various courses
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	COLLEGES									
	Camosun	Cariboo	Capilano	New Caledonia	Douglas	East Kootenay	Fraser Valley	Kwantlen	Malaspina	North Island
Management (Recreation Facility)										
Management (Hotel/Motel/Restaurant)	D	T,C				C			D	
Management (Ski Area)									D	T,C
Management (Tourism)	C	C								T
Travel Counsellor										T
						T				T
TRADES PROGRAMS										
Construction:Bricklaying/Masonry								T		
Construction:Carpentry	T,C		T,C	T,C			T,C	T,C	T,C	
Construction:Joinery/Fine Woodwork	T,C		T,C				T,C		T,C	
Construction:Plumbing	T,C									
Construction:Sprinklerfitting/Steamfitting	T,C									
Electronics/Electrician	T,C		T,C	T,C		T,C		T,C		C
Gasfitting	T,C									
Mechanical:Air Brakes				T		T	T			T
Mechanical:Automotive Body Repair	T,C									T,C
Mechanical:Automotive Mechanics	T,C		T,C	T,D		T,C	T,C	T,C	T,C	T,C
Mechanical:Auto. Painting &Refinishing	C									
Mechanical:Commercial Trans. Mech./ Recreation Vehicles Tech.	T,C		T,C			T,C	T,C			
Mechanical:Computer Numerical Control (CNC) Mach. Oper. Trade	D									
Mechanical:Diesel Engine Mechanics	T,C		T,C	T,C			T,C		T,C	
Mechanical:Energy Management Upgrade										
Mechanical:Heavy Duty Mechanics	T,C		T,C	T,D		T,C	T,C		T,C	C
Mechanical:Heavy Equipment Operator									T,C	
Mechanical:Machinist										
Mechanical:Millwright (Industrial Mechanic)				T,C				T,C	T,C	
Mechanical:Motorcycle/Inboard-Outboard/ Small Eng.Mech.	T,C		T,C			T,C			T,C	
Mechanical:Partsperson			T,C			T,C	T,C	T,C		
Mechanical:Power Engineering (various)	T,C			T,C		T,C				
Mechanical:Refrigeration Operator	T,C									
Metal Working: Boilermaker/Ironworker/ Sheet Metal Worker/Steel Fabricator										
Metal Working:Welding	T,C		T,C	T,C		T,C	T,C	T,C	T,C	T,C
Other:Commercial Driver Training				T					T	T
Other:Jeweller & Goldsmith										
Other: (Power Sewing/Shoe Repair)										
Other:Upholstery – (Auto Trimmer/ Custom Furniture)	T,C	T,C								
Other:Women's Introduction to Trades									T	

							INSTITUTES				UNIVERSITIES			
	Northern Lights	Northwest	Okanagan	OLA Open College	Selkirk	Vancouver Community College	BCIT	Emily Carr	Justice Institute	Pacific Marine	OLA Open University	Simon Fraser University	University Of British Columbia	University Of Victoria
					T	T,D								
			C	C			D							
					C									
							D					V,T		
	T	T	C	C		T,C	V							
							T,C							
	T,C	T,C	T,C	T		T,C	T,C							
	T,C	T,C	T,C		T		T,C							
				T,C			T,C							
				V			T,C							
		C		T,C	T,C	T,C	T,C							
							T,C							
	T	T	V				V							
	C		C			T,C								
	T,C	T,C	T,C	T,C	T,C	T,C	T,C							
	C		C			T,C								
	T,C		T,C	T,C	T,C		T,C							
							T,C							
		C				T,C	T,C							
						T,C								
	C	T,C	C	T,C	T,C		T,C							
		T			T		T,C							
		T,C		T,C	T,C		T,C							
	C	T,C			T,C		T,C							
	C													
	T,C			T,C		T,C								
				T,C		T,C	V							
							T,C							
	T,C	T,C	T,C		T,C		T,C							
	T	T			T									
						T								
			V			T								
							T,C							

TECHNICAL COMMENTS

This book has been presented in plain language so as to make it understandable to the non-technical reader. However, the following are a few areas where some further explanation may be useful or necessary.

STATISTICAL DATA used in the tables, and as a background to the descriptive text, was gathered from the Census of Canada of 1971, 1981 and 1986 and from COPS (Canadian Occupational Projection System). COPS was developed by Employment and Immigration Canada as an information system to provide historical, current and projected data on occupational needs and supply trends to 1995 on a national and provincial basis. While the COPS system provides a few different scenarios to test different economic conditions across Canada, the specific scenario used for this JOB FUTURES-BRITISH COLUMBIA publication is the B.C. "Provincial" scenario.

ESTIMATES OF EMPLOYMENT AND GROWTH have been rounded to the nearest 10. This rounding process will mean that estimated employment in 1987 plus growth from 1987 to 1995 will not necessarily add to the employment estimate for 1995.

OCCUPATION TITLES AND CODES used are from the Standard Occupational Classification (SOC), which is the occupational classification system used by the Census. The 4-digit number that appears in each occupational statement classifies the job group primarily by the kind of work performed. Minor differences exist between the SOC and CCDO (Canadian Classification Dictionary of Occupations), which is the occupational classification system normally used in employment counselling and placement. For example, in a few cases, additional groups are used in the SOC, thereby providing a wider information base. A good example of this is found in the medicine and health field, where the CCDO classification 3137: Physiotherapists, Occupational and Other Therapists, has been expanded into 3 separate codes in the SOC. They are 3136: Audio and Speech Therapists; 3137: Physiotherapists; and 3138: Occupational Therapists.

THE SELECTION OF OCCUPATIONS has been made primarily on the basis of three criteria:

(1) whether the occupation had a higher than average growth rate in persons employed compared to all other occupations in B.C.;
(2) how important the occupation is in B.C. in absolute numbers; and
(3) an informed choice on occupations by our staff and a variety of industrial and professional sources.

It should be clear that this selection of 187 occupational groups covers a broad field, encompassing approximately 75% of total employment, but does not include all occupations or all the interesting employment prospects which may be available in B.C.

INDUSTRIES have been identified in such a way as to provide the most appropriate context. Usually this identification is directly matched with an industry title and code from the Standard Industrial Classification (S.I.C.) of 1980. A few descriptions, still drawn from the S.I.C., were more detailed e.g. the use of the description "veterinary services" rather than using the classification "agricultural services"

	INSTITUTES									UNIVERSITIES			
	Northern Lights	Northwest	Okanagan	OLA Open College	Selkirk	Vancouver Community College	BCIT	Emily Carr	Justice Institute	Pacific Marine	OLA Open University	Simon Fraser University	University Of British Columbia	University Of Victoria
					T	T,D								
			C	C			D							
					C									
							D					V,T		
	T	T	C	C		T,C	V							
							T,C							
	T,C	T,C	T,C	T		T,C	T,C							
	T,C	T,C	T,C		T		T,C							
				T,C			T,C							
				V			T,C							
		C		T,C	T,C	T,C	T,C							
							T,C							
	T	T	V				V							
	C		C			T,C								
	T,C	T,C	T,C	T,C	T,C	T,C	T,C							
	C		C			T,C								
	T,C		T,C	T,C	T,C		T,C							
							T,C							
		C				T,C	T,C							
						T,C								
	C	T,C	C	T,C	T,C		T,C							
		T			T		T,C							
		T,C		T,C	T,C		T,C							
	C	T,C			T,C		T,C							
	C													
	T,C			T,C		T,C								
				T,C		T,C	V							
							T,C							
	T,C	T,C	T,C		T,C		T,C							
	T	T			T									
						T								
			V			T								
							T,C							

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GEOGRAPHIC DISTRIBUTION is based on the distribution of employment in each occupation as reported by the 1986 Census for C E.I.C. Labour Market Areas. These areas have been combined and approximate to the B.C. Development Regions as follows:

	C.E.I.C. Labour Market Areas	B.C. Development Regions
Lower Mainland	Metro Vancouver Fraser Valley	Lower Mainland/South West
Vancouver Island	Vancouver Island	Vancouver Island/Coast
Okanagan/Kootenay	Okanagan/Kootenay	Okanagan Kootenay
Northern B.C.	North Central Skeena	Cariboo North Coast Nechako Peace River

COMPARATIVE STATEMENTS are used extensively to place each occupation into a context of the entire labour market. These statements refer to job growth; job size; and unemployment levels based on administrative information on Unemployment Insurance claimants. A comparison of each of these measures is made against the provincial average. The accompanying schedules explain what is meant by these comparative statements.

Job Growth Rates Between 1987 and 1995

If the statement reads...	*Employment is projected to...*
Grow much faster than the average	Increase 2.5% or more annually
Grow faster than the average	Increase 2.0 to 2.4% annually
Grow about as fast as the average	Increase about 1.8% annually
Grow more slowly than the average	Increase 1.6% or less annually

Job Size

If the statement reads...	*The number of jobs in 1995 is expected to be...*
A very large job group	10,000 up to 100,000
A large job group	5,000 to 9,999
A fairly large job group	2,000 to 4,999
A medium size job group	1,000 to 1,999
A small job group	999 or less

Existing supply of workers

If the statement reads...	*The ratio of U.I. Claimants to Employment is...*
Low unemployment in 1987	Lower than the average for all occupations
About average unemployment in 1987	About the same as the average for all occupations
High unemployment in 1987	Far higher than the average for all occupations

FORECASTS OF OCCUPATIONAL GROWTH are based on a number of factors, most of which are not precisely known. First and foremost among these factors is the state of the B.C. economy and potential growth of the industries that make up the economic structure of the province. In turn this depends on a wide range of factors including changes in markets and in technology. Markets and competitiveness allow for the production of goods or services. And this production of goods or services translates into the employment of people in all the different occupational groups. The projections of employment at an occupational level within the COPS system is a fairly mechanical exercise, consisting of distributing employment for each industry across all the occupations found in that industry according to the pattern of occupational employment found in the latest Census. Beyond this projection method, the analysis of other trends and inclusion of expert advice leads to the more subjective commentary on occupational forecasts.

LABOUR MARKETS are different from other markets because they involve the exchange of human services. Hence a complex set of motivations, preferences, social and psychological factors enter into each individual's decision. This makes the analysis of labour market trends difficult. For example, people change working hours or retirement age; people also have strong job preferences or location preferences; personal concerns, career concerns and financial concerns all have different outcomes depending on the individual's preference. These patterns will also change during an individual's life. Many of these factors affect job opportunities, although frequently they cannot be quantified. An attempt has been made to point out these aspects in each occupational profile.

NUMBER OF ESTIMATED JOB OPENINGS to 1995 includes new jobs as well as those job opportunities which result from the need to replace existing personnel who leave because of retirement, who leave the labour market to return to the household or to the educational system. This replacement need is called attrition.

AVERAGE ANNUAL EARNINGS provide comparable measures between occupations. The average annual earnings figure includes the employment income of all employed persons (full and part-time, full and part-year). In those cases where a high rate of part-time or part-year (seasonal) employment typifies an occupation, the average annual incomes of workers employed full-time, full-year are presented to minimize distortion. Full-time, full-year, as described by the 1986 Census, refers to individuals who considered their work to be full-time and who worked for 49 to 52 weeks in the previous year. Where available, 1989 wage rates from the labour market informaion data bases of Employment and Immigration Canada have been added to provide more up-to-date figures.

UNIVERSITIES AND COLLEGES discussed in this publication are the public institutions in British Columbia. There are also private educational institutions in B.C. and educational institutions elsewhere in Canada which may offer similar programs.

RESEARCHERS and others who want further information in this area are advised to contact the research staff at one of the offices of the two co-publishers of this book:

Employment and Immigration Canada
Economic Services Branch, Vancouver
Phone: 666-8365

B.C. Ministry of Advanced Education and Job Training, and Ministry Responsible for Science and Technology
Labour Market Policy Branch, Victoria
Phone: 387-3380

INDEX

Occupations by Name

A

Accountants 10
Accounting Clerks 84
Administrators In Medicine and Health 4
Administrators In Teaching 3
Advertising and Illustrating Artists 75
Advertising Management Occupations 7
Advertising Sales Occupations 107
Aerospace Engineers 32
Agricultural Engineers 27
Agriculturalists and Related Scientists 18
Air Pilots, Navigators and Flight Engineers 188
Air Transport Operating Support Occupations 189
Aircraft Mechanics and Repairers 164
Architects 22
Architectural Technologists and Technicians 36
Archivists 45
Arrangers, Music 77
Artists, Advertising and Illustrating 75
Attendants, Nursing 60
Audio and Speech Therapists 61
Auditors 10
Automobile Mechanics and Repairers 163

B

Baking, Confectionery Making and Related Occupations 140
Bank Clerks 86
Barbers, Hairdressers and Related Occupations 119
Bartenders 115
Beverage Serving Occupations 116
Biologists and Related Scientists 19
Blasting Occupations 137
Boilermakers, Platers and Structural Metal Workers 154
Bookkeepers and Accounting Clerks 84
Bricklayers/Masons and Tile Setters 178
Bus Drivers 193
Business and Commercial Machine Mechanics and Repairers 166
Business Services Sales Occupations 108

C

Cabinet and Wood Furniture Makers 159
Camera Operators 76
Captains and Other Officers, Fishing Vessels 126
Carpenters and Related Occupations 177

Cashiers and Tellers 85
Charworkers 120
Chefs and Cooks 114
Chemical Engineers 23
Chemists 14
Civil Engineers 24
Claims Adjusters 94
Cleaners, Charworkers and Janitors 120
Clerk-Typists 83
Clerks, Accounting 84
Clerks, Bank 86
Clerks, File 92
Clerks, Finance 86
Clerks, General Office 97
Clerks, Hotel 96
Clerks, Information 93
Clerks, Insurance 86
Clerks, Library 92
Clerks, Other Finance 86
Clerks, Production 89
Clerks, Receiving 90
Clerks, Sales 103
Clerks, Shipping 90
Clerks, Stock 91
Clerks, Travel 95
Coaches, Trainers and Instructors: Sport and Recreation 80
Commercial Machine Mechanics and Repairers 166
Commercial Travellers 102
Community College and Vocational School Teachers 52
Community Planners 33
Community Service Occupations 43
Composers 77
Computer Operators 88
Computer Programmers and Related Occupations 37
Computer Repairers 157
Concrete Finishing and Related Occupations 179
Conductors, Composers and Arrangers 77
Confectionery Making and Related Occupations 140
Conservators, Librarians and Archivists 45
Construction Machinery Mechanics and Repairers 165
Construction Electricians and Repairers 174
Cooks 114
Counsellors, Educational and Vocational 46
Crew, Fishing Vessels 126

D

Day-Care/Preschool Supervisors 50
Deck Crew, Ship 192

Deck Officers 190
Dental Assistants 70
Dental Hygienists 70
Dental Laboratory Technicians 69
Dentists 57
Denturists 69
Detectives, Government 111
Die Making Occupations 149
Dietitians and Nutritionists 65
Dispensing Opticians 66
Draughting Occupations 35
Dressmakers 161

E

Early Childhood Education 50
Economists 40
Editors 79
Educational and Vocational Counsellors 46
Electrical and Related Equipment Handling and Repairing Occupations 156
Electrical Engineer 25
Electrical Power Line Installers and Repairers and Related Occupations 173
Electricians, Construction 174
Electronic and Related Equipment Installing and Repairing Occupations 157
Electronic Data-Processing Equipment Operators 88
Elementary and Kindergarten Teachers 50
Engineering Officers, Ship 191
Engineering Technologists and Technicians 36
Engineers, Aerospace 32
Engineers, Agricultural 27
Engineers, Chemical 23
Engineers, Civil 24
Engineers, Electrical 25
Engineers, Flight 188
Engineers, Industrial 26
Engineers, Mechanical 28
Engineers, Metallurgical 29
Engineers, Mining 30
Engineers, Petroleum 31
Engineers, Power 199
Engineers, Professional 27
Excavating, Grading and Related Occupations 172

F

Farm Machinery Mechanics and Repairers 165
Fashion Designers 74
File Clerks 92
Finance Clerks 86
Financial Management Occupations 5

Financial Officers 10
Fine Arts Teachers 53
Fire-Fighting Occupations 110
Fishing Vessel Captains and Other Officers 126
Fishing Vessel Crew 126
Flame Cutting Occupations 153
Flight Engineers 188
Food and Beverage Preparation and Related Serving Occupations Supervisors 113
Food and Beverage Serving Occupations 116
Foresters and Occupations in Life Sciences 21
Forestry Conservation Occupations 128
Freight Agents 95

G

General Managers 2
General Office Clerks 97
Geologists 15
Glaziers 185
Grading, Excavating and Related Occupations 172
Graduate Nurses 59
Guards and Related Security Occupations 112

H

Hairdressers and Related Occupations 119
Helicoptrer Pilots 188
Hoisting Occupations 196
Hotel Clerks 96

I

Illustrating Artists 75
Industrial Machinery Mechanics and Repairers 165
Industrial Engineers 26
Industrial (Precision) Instrument Mechanics and Repairers 167
Industrial Relations Management Occupations 6
Information Clerks 93
Inspecting and Testing Occupations:
Electrical Power, Lighting and Wire Communications Equipment 176
Inspecting, Testing and Grading Occupations:
Wood Processing, (except Paper Pulp) 145
Instructors, Sport and Recreation 80
Insulating Occupations, Construction 182
Insurance, Bank and Other Finance Clerks 86
Insurance Sales Occupations 104
Interior Designers 74

J

Janitors, Charworkers and Cleaners 120
Jewellery and Silverware Fabricating, Assembling and Repairing Occupations 169

K

Kindergarten Teachers 50

L

Lawyers and Notaries 44
Librarians, Archivists and Conservators 45
Library and File Clerks 92
Licensed Practical Nurses (LPNs) 60
Life Sciences Occupations 21
Life Sciences Technologists and Technicians 20
Livestock Workers 122
Lodging Cleaners, (except Private Household) 118
Lodging and Other Accommodation Occupations Supervisors 117
Log Grading and Related Occupations 130
Log Hoisting, Sorting, Moving and Related Occupations 131
Log Inspecting, Grading, Scaling and Related Occupations 130
Log Moving and Related Occupations 131
Log Scaling and Related Occupations 130
Log Sorting and Related Occupations 131

M

Machine Tool Setting-Up Occupations 150
Machinists and Machine Tool Setting-Up Occupations 150
Marine Craft Fabricating, Assembling and Repairing Occupations 170
Managers, Advertising 7
Managers, Financial 5
Managers, General 2
Managers, Industrial Relations 6
Managers, Other 9
Managers, Personnel 6
Managers, Sales 7
Managers, Services 8
Masons and Tile Setters 178
Meat Canning 141
Meat Curing 141
Meat Cutting 141
Meat Packing 141
Mechanical Engineers 28
Mechanics, Aircraft 164
Mechanics, Business Machines 166
Mechanics, Commercial Machines 166
Mechanics, Construction Machinery 165
Mechanics, Farm Machinery 165
Mechanics, Industrial Machinery 165
Mechanics, Industrial (Precision) Instrument 167
Mechanics, Motor Vehicle 163
Mechanics, Other 168
Medical Laboratory Technologists and Technicians 68

Metallurgical Engineers 29
Meteorologists 16
Methods Analysts 26
Millwrights, Industrial, Farm and Construction Machinery Mechanics and Repairers 165
Mining Engineers 30
Motor Vehicle Mechanics and Repairers 163
Musicians and Singers 77

N

Navigators and Flight Engineers 188
Notaries and Lawyers 44
Nursery and Related Occupations 123
Nurses, Graduate 59
Nurses, Licensed Practical (LPNs) 60
Nurses: Registered, Graduate and Nurses-in-Training 59
Nurses-in-Training 59
Nursing Attendants 60
Nutritionists 65

O

Occupational Therapists 63
Occupations in Community Services 43
Occupations in Labouring and Other Elemental Work, Forestry and Logging 132
Occupations in Labouring and Other Elemental Work, Pulp and Papermaking 148
Occupations in Life Sciences 21
Occupations in Welfare and Community Services 43
Occupations Related to Administration 12
Occupations Related to Management and Administration 12
Office Machine Operators 87
Officers, Deck 190
Organization and Methods Analysts 26
Other Administrators 9
Other Finance Clerks 86
Other Labouring and Elemental Work: Wood Processing (except Paper Pulp) 146
Other Managers 9
Other Mechanics and Repairers 168
Other Mining and Quarrying (including Oil and Gas Field Occupations) 138
Other Music and Musical Entertainers 77
Other Officers, Fishing Vessels 126
Other Senior Officials 2

P

Painters, Paperhangers and Related Occupations 181
Paperhangers 181
Papermaking and Finishing Occupations 147
Parole Officer 42
Pattern Making, Marking and Cutting Occupations: Textile, Fur and Leather Products 160

Personnel and Related Officers 11
Personnel Management Occupations 6
Petroleum Engineers 31
Pharmacists 64
Photographers and Camera Operators 76
Photographic Processing Occupations 202
Physical Sciences Technologists and Technicians 17
Physicians and Surgeons 56
Physiotherapists 62
Pipefitting, Plumbing and Related Occupations 183
Plasterers and Related Occupations 180
Platers and Structural Metal Workers 154
Plumbing and Related Occupations 183
Plywood Making and Related Occupations 143
Police Officers and Detectives, Government 111
Power Engineer 199
Practical Nurses, Licen 1 (LPNs) 60
Preschool/Day-Care Supervisor 50
Printing Press Occupations 198
Product and Interior Designers 74
Production Clerks 89
Professional Engineers 27
Programmers, Computer 37
Psychologists 41

R

Radio and Television Announcers 78
Radio and Television Broadcasting Equipment Operators 200
Radio and Television Repairers 158
Radiological Technologists and Technicians 67
Real Estate Sales Occupations 105
Receiving Clerks 90
Receptionists and Information Clerks 93
Registered Nurses 59
Repairers, Aircraft 164
Repairers, Business Machines 166
Repairers, Commercial Machines 166
Repairers, Construction Machinery 165
Repairers, Electrical and Related Equipment 156
Repairers, Electrical Power Line 173
Repairers, Electronic and Related Equipment 157
Repairers, Farm Machinery 165
Repairers, Industrial Machinery 165
Repairers, Industrial (Precision) Instrument 167
Repairers: Electrical Power, Lighting and Wire Communications Equipment 176
Repairers, Jewellery 169
Repairers, Marine Craft 170
Repairers, Motor Vehicle 163
Repairers, Other 168

Repairers, Radio 158
Repairers, Saw 151
Repairers, Silverware 169
Repairers, Television 158
Repairers, Wire Communications and Related Equipment 175
Respiratory Technicians 71
Rock and Soil Drilling Occupations 136
Rotary Well-Drilling and Related Occupations 135

S

Sales, Advertising 107
Sales Agents and Traders, Securities 106
Sales, Business Services 108
Sales Clerks and Salespersons Commodities 103
Sales, Insurance 104
Sales Management Occupations 7
Sales, Real Estate 105
Sales Supervisors, Commodities 100
Sales, Technical 101
Salespersons, Commodities 103
Saw Filing Occupations 151
Saw Repairers and Related Metal Working Occupations 151
Sawmill Sawyers and Related Occupations 142
Secondary School Teachers 51
Secretaries and Stenographers 82
Security Occupations 112
Service Management Occupations 8
Sheet Metal Workers 152
Ship Deck Crew 192
Shipping and Receiving Clerks 90
Silverware Fabricating, Assembling and Repairing Occupations 169
Singers 77
Slaughtering and Meat Cutting, Canning, Curing and Packing Occupations 141
Social Workers 42
Soil Drilling Occupations 136
Sound and Video Recording and Reproduction Equipment Operators 201
Speech Therapists 61
Station Agents 95
Stationary Engine (Power Engineer) and Utilities Equipment Operating and Related Occupations 199
Stenographers 82
Stock Brokers 106
Stock Clerks and Related Occupations 91
Structural Metal Erectors 184
Structural Metal Workers 154
Supervisors, Food and Beverage Preparation and Related Occupations 113
Supervisors, Occupations in Lodging and Other Accommodation 117
Supervisors Preschool/Day-Care 50
Supervisors Sales Occupations, Commodities 100

Surgeons 56
Surveyors 34
Systems Analysts, Computer Programmers and Related Occupations 37

T

Tailors and Dressmakers 161
Teachers, Community College 52
Teachers, Elementary 50
Teachers, Fine Arts 53
Teachers, Kindergarten 50
Teachers, Secondary Schools 51
Teachers, University 48
Teachers, Vocational School 52
Technical Sales Occupations and Related Advisors 101
Television Announcers 78
Television Broadcasting Equipment Operators 200
Television Repairers 158
Tellers 85
Ticket Agents 95
Tile Setters 178
Timber Cutting and Related Occupations 129
Tool and Die Making Occupations 149
Traders, Securities 106
Trainers, Sport and Recreation 80
Travel Clerks, Ticket, Station and Freight Agents 95
Truck Drivers 194
Typists and Clerk-Typists 83

U

University Teachers 48
University Teaching and Related Occupations 49
Upholsterers 162
Utilities Equipment Operating 199

V

Veterinarians 58
Video Recording and Reproduction Equipment Operators 201
Vocational Counsellors 46
Vocational School Teachers 52

W

Welding and Flame Cutting Occupations 153
Wire Communications and Related Equipment Installing and Repairing Occupations 175
Wood Furniture Makers 159
Wood Treating Occupations 144
Writers and Editors 79

INDEX

Occupations by Classification Number

11 Managerial, Administrative and Related Occupations

1130	General Managers and Other Senior Officials	2
1133	Administrators In Teaching and Related Fields	3
1134	Administrators In Medicine and Health	4
1135	Financial Management Occupations	5
1136	Personnel and Industrial Relations Management Occupations	6
1137	Sales and Advertising Management Occupations	7
1142	Services Management Occupations	8
1149	Other Managers and Administrators	9
1171	Accountants, Auditors and Other Financial Officers	10
1173	Organization and Methods Analysts	26
1174	Personnel and Related Officers	11
1179	Occupations Related to Management and Administration	12

21 Occupations in Natural Sciences, Engineering and Mathematics

2111	Chemists	14
2112	Geologists	15
2114	Meteorologists	16
2117	Physical Sciences Technologists and Technicians	17
2131	Agriculturalists and Related Scientists	18
2133	Biologists and Related Scientists	19
2135	Life Sciences Technologists and Technicians	20
2139	Foresters and Occupations in Life Sciences	21
2141	Architects	22
2142	Chemical Engineers	23
2143	Civil Engineers	24
2144	Electrical Engineers	25
2145	Industrial Engineers	26
2146	Agricultural Engineers	27
2147	Mechanical Engineers	28
2151	Metallurgical Engineers	29
2153	Mining Engineers	30
2154	Petroleum Engineers	31
2155	Aerospace Engineers	32
2157	Community Planners	33
2159	Professional Engineers	27
2161	Surveyors	34
2163	Draughting Occupations	35
2164	Architectural Technologists and Technicians	36
2165	Engineering Technologists and Technicians	36
2183	Systems Analysts, Computer Programmers and Related Occupations	37

Surgeons 56
Surveyors 34
Systems Analysts, Computer Programmers and Related Occupations 37

T

Tailors and Dressmakers 161
Teachers, Community College 52
Teachers, Elementary 50
Teachers, Fine Arts 53
Teachers, Kindergarten 50
Teachers, Secondary Schools 51
Teachers, University 48
Teachers, Vocational School 52
Technical Sales Occupations and Related Advisors 101
Television Announcers 78
Television Broadcasting Equipment Operators 200
Television Repairers 158
Tellers 85
Ticket Agents 95
Tile Setters 178
Timber Cutting and Related Occupations 129
Tool and Die Making Occupations 149
Traders, Securities 106
Trainers, Sport and Recreation 80
Travel Clerks, Ticket, Station and Freight Agents 95
Truck Drivers 194
Typists and Clerk-Typists 83

U

University Teachers 48
University Teaching and Related Occupations 49
Upholsterers 162
Utilities Equipment Operating 1[illegible]

V

Veterinarians 58
Video Recording and Reproduction Equipment Operators 201
Vocational Counsellors 46
Vocational School Teachers 52

W

Welding and Flame Cutting Occupations 153
Wire Communications and Related Equipment Installing and Repairing Occupations 175
Wood Furniture Makers 159
Wood Treating Occupations 144
Writers and Editors 79

INDEX

Occupations by Classification Number

11 Managerial, Administrative and Related Occupations

1130	General Managers and Other Senior Officials	2
1133	Administrators In Teaching and Related Fields	3
1134	Administrators In Medicine and Health	4
1135	Financial Management Occupations	5
1136	Personnel and Industrial Relations Management Occupations	6
1137	Sales and Advertising Management Occupations	7
1142	Services Management Occupations	8
1149	Other Managers and Administrators	9
1171	Accountants, Auditors and Other Financial Officers	10
1173	Organization and Methods Analysts	26
1174	Personnel and Related Officers	11
1179	Occupations Related to Management and Administration	12

21 Occupations in Natural Sciences, Engineering and Mathematics

2111	Chemists	14
2112	Geologists	15
2114	Meteorologists	16
2117	Physical Sciences Technologists and Technicians	17
2131	Agriculturalists and Related Scientists	18
2133	Biologists and Related Scientists	19
2135	Life Sciences Technologists and Technicians	20
2139	Foresters and Occupations in Life Sciences	21
2141	Architects	22
2142	Chemical Engineers	23
2143	Civil Engineers	24
2144	Electrical Engineers	25
2145	Industrial Engineers	26
2146	Agricultural Engineers	27
2147	Mechanical Engineers	28
2151	Metallurgical Engineers	29
2153	Mining Engineers	30
2154	Petroleum Engineers	31
2155	Aerospace Engineers	32
2157	Community Planners	33
2159	Professional Engineers	27
2161	Surveyors	34
2163	Draughting Occupations	35
2164	Architectural Technologists and Technicians	36
2165	Engineering Technologists and Technicians	36
2183	Systems Analysts, Computer Programmers and Related Occupations	37

23 Occupations in Social Sciences and Related Occupations

2311	Economists	40
2315	Psychologists	41
2331	Social Workers	42
2333	Occupations in Welfare and Community Services	43
2343	Lawyers and Notaries	44
2351	Librarians, Archivists and Conservators	45
2391	Educational and Vocational Counsellors	46

27 Teaching and Related Occupations

2711	University Teachers	48
2719	University Teaching and Related Occupations	49
2731	Elementary and Kindergarten Teachers	50
2733	Secondary School Teachers	51
2791	Community College and Vocational School Teachers	52
2792	Fine Arts Teachers	53

31 Occupations in Medicine and Health

3111	Physicians and Surgeons	56
3113	Dentists	57
3115	Veterinarians	58
3131	Nurses: Registered, Graduate and Nurses-in-Training	59
3134	Licensed Practical Nurses (LPNs)	60
3135	Nursing Attendants	60
3136	Audio and Speech Therapists	61
3137	Physiotherapists	62
3138	Occupational Therapists	63
3151	Pharmacists	64
3152	Dietitians and Nutritionists	65
3154	Dispensing Opticians	66
3155	Radiological Technologists and Technicians	67
3156	Medical Laboratory Technologists and Technicians	68
3157	Denturists	69
3158	Dental Hygienists and Dental Assistants	70
3161	Dental Laboratory Technicians	69
3162	Respiratory Technicians	71

33 Artistic, Literary, Recreational and Related Occupations

3313	Product and Interior Designers	74
3314	Advertising and Illustrating Artists	75
3315	Photographers and Camera Operators	76
3331	Conductors, Composers and Arrangers	77
3332	Musicians and Singers	77
3333	Other Music and Musical Entertainers	77
3337	Radio and Television Announcers	78
3351	Writers and Editors	79
3370	Coaches, Trainers and Instructors: Sports and Recreation	80

41 Clerical and Related Occupations

4111	Secretaries and Stenographers	82
4113	Typists and Clerk-Typists	83
4131	Bookkeepers and Accounting Clerks	84
4133	Cashiers and Tellers	85
4135	Insurance, Bank and Other Finance Clerks	86
4141	Office Machine Operators	87
4143	Electronic Data-Processing Equipment Operators	88
4151	Production Clerks	89
4153	Shipping and Receiving Clerks	90
4155	Stock Clerks and Related Occupations	91
4161	Library and File Clerks	92
4171	Receptionists and Information Clerks	93
4192	Claims Adjusters	94
4193	Travel Clerks, Ticket, Station and Freight Agents	95
4194	Hotel Clerks	96
4197	General Office Clerks	97

51 Sales Occupations

5130	Supervisors Sales Occupations, Commodities	100
5131	Technical Sales Occupations and Related Advisors	101
5133	Commercial Travellers	102
5135	Sales Clerks and Salespersons, Commodities	103
5171	Insurance Sales Occupations	104
5172	Real Estate Sales Occupations	105
5173	Sales Agents and Traders, Securities	106
5174	Advertising Sales Occupations	107
5177	Business Services Sales Occupations	108

61 Service Occupations

6111	Fire-Fighting Occupations	110
6112	Police Officers and Detectives, Government	111
6115	Guards and Related Security Occupations	112
6120	Supervisors: Food and Beverage Preparation and Related Service Occupations	113
6121	Chefs and Cooks	114
6123	Bartenders	115
6125	Food and Beverage Serving Occupations	116
6130	Supervisors: Occupations in Lodging and Other Accommodation	117
6133	Lodging Cleaners (except Private Household)	118
6143	Barbers, Hairdressers and Related Occupations	119
6191	Janitors, Charworkers and Cleaners	120

71 Farming, Horticultural and Animal Husbandry Occupations

7183	Livestock Farmers	122
7195	Nursery and Related Occupations	123

73 Fishing, Trapping and Related Occupations

7311	Captains and Other Officers, Fishing Vessels	126
7313	Crew, Fishing Vessels	126

75 Forestry and Logging Occupations

7511	Forestry Conservation Occupations	128
7513	Timber Cutting and Related Occupations	129
7516	Log Inspecting, Grading, Scaling and Related Occupations	130
7517	Log Hoisting, Sorting, Moving and Related Occupations	131
7518	Labouring and Other Elemental Work, Forestry and Logging	132

77 Mining and Quarrying (including Oil and Gas Field) Occupations

7711	Rotary Well-Drilling and Related Occupations	135
7713	Rock and Soil Drilling Occupations	136
7715	Blasting Occupations	137
7719	Other Mining and Quarrying (including Oil and Gas Field) Occupations	138

81/82 Processing Occupations

8213	Baking, Confectionery Making and Related Occupations	140
8215	Slaughtering and Meat Cutting, Canning, Curing and Packing Occupations	141
8231	Sawmill Sawyers and Related Occupations	142
8233	Plywood Making and Related Occupations	143
8235	Wood Treating Occupations	144
8236	Inspecting, Testing and Grading Occupations: Wood Processing (except Paper Pulp)	145
8238	Labouring and Elemental Work:	146
	Wood Processing (except Paper Pulp)	146
8253	Papermaking and Finishing Occupations	147
8258	Occupations in Labouring and Other Elemental Work: Pulp and Papermaking	148

83 Machining and Related Occupations

8311	Tool and Die Making Occupations	149
8313	Machinists and Machine Tool Setting-Up Occupations	150
8319	Saw Repairers and Related Metal Machining Occupations	151
8393	Lumber Manufacturing	151
8333	Sheet Metal Workers	152
8335	Welding and Flame Cutting Occupations	153
8337	Boilermakers, Platers and Structural Metal Workers	154
8393	Saw Filing Occupations	151

85 Product Fabricating, Assembling and Repairing Occupations

8533	Electrical and Related Equipment Handling and Repairing Occupations	156
8535	Electronic and Related Equipment Installing and Repairing Occupations	157
8537	Radio and Television Repairers	158
8541	Cabinet and Wood Furniture Makers	159
8551	Pattern Making, Marking and Cutting Occupations: Textile, Fur and Leather Products	160
8553	Tailors and Dressmakers	161
8562	Upholsterers	162
8581	Motor Vehicle Mechanics and Repairers	163
8582	Aircraft Mechanics and Repairers	164
8584	Millwrights, Industrial, Farm and Construction Machinery Mechanics and Repairers	165
8585	Business and Commercial Machine Mechanics and Repairers	166
8588	Industrial (Precision) Instrument Mechanics and Repairers	167
8589	Other Mechanics and Repairers	168
8591	Jewellery and Silverware Fabricating, Assembling and Repairing Occupations	169
8592	Marine Craft Fabricating, Assembling and Repairing Occupations	170

87 Construction Trades Occupations

8711	Excavating, Grading and Related Occupations	172
8731	Electrical Power Line Installers and Repairers and Related Occupations	173
8733	Construction Electricians and Repairers	174
8735	Wire Communications and Related Equipment Installing and Repairing Occupations	175 175
8736	Inspecting and Testing Occupations: Electrical Power, Lighting and Wire Communications Equipment	176
8781	Carpenters and Related Occupations	177
8782	Bricklayers/Masons and Tile Setters	178
8783	Concrete Finishing and Related Occupations	179
8784	Plasterers and Related Occupations	180
8785	Painters, Paperhangers and Related Occupations	181
8786	Insulating Occupations, Construction	182
8791	Pipefitting, Plumbing and Related Occupations	183
8793	Structural Metal Erectors	184
8795	Glaziers	185

91 Transport Equipment Operating Occupations

9111	Air Pilots, Navigators and Flight Engineers	188
9113	Air Transport Operating Support Occupations	189
9151	Deck Officers	190
9153	Engineering Officers, Ship	191
9155	Deck Crew, Ship	192
9171	Bus Drivers	193
9175	Truck Drivers	194

93 Material Handling and Related Occupations

9311	Hoisting Occupations	196

95 Other Crafts and Equipment Operating Occupations

9512	Printing Press Occupations	198
9539	Stationary Engine (Power Engineers) and Utilities Equipment Operating and Related Occupations	199
9551	Radio and Television Broadcasting Equipment Operators	200
9555	Sound and Video Recording and Reproduction Equipment Operators	201
9591	Photographic Processing Occupations	202